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This One



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LETTERS AND PAPERS

ON

AGRICULTURE, PLANTING, &c.

SELECTED FROM

THE CORRESPONDENCE

OF THE

BATH AND WEST OF ENGLAND SOCIETY,

FOR THE ENCOURAGEMENT OF

AGRICULTURE,
ARTS,

|| MANUFACTURES,
AND COMMERCE.

VOL. XIII.



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LETTERS

TO THE

BATH AND WEST OF ENGLAND AGRICULTURAL SOCIETY.

ARTICLE I.

On the Cultivation of Fiorin Grafs.

[By W. RICHARDSON, D.D. of Moy, Ireland.]

*To the Honourable the Bath and West of England
Agricultural Society.*

I FEEL the highest gratification in the honour conferred upon me by the Bath and West of England Agricultural Society, in proposing a considerable premium to encourage the cultivation of a grafs, first brought into notice by me, as of any value.

A condition very flattering to me is added, that to entitle any person to this premium, it is necessary that he should have obtained his original stock of Fiorin Grafs from Dr. Richardson ; and on my part I have shewn my promptness to enable candidates to fulfil this condition, having already transmitted to the Secretary of the Society a considerable package of Fiorin roots and strings ; and I shall continue to transmit similar parcels, whenever I find an opportunity.

I have been very sanguine in disseminating a discovery, which I had a certainty would lead to the improvement of the united kingdom, to an extent and with a facility hardly to be conceived. I spared no pains in laying before the public, in different shapes, the valuable properties of Fiorin grass, as I successively discovered them; I gave the necessary instruction for its cultivation ; and held out every encouragement in my power to those who wished to avail themselves of the singular qualities of this extraordinary grass, or rather of that part of its produce, its *stolones*, upon the value of which I first brought notice.

Though not without success, my progress was far short of my expectations: difficulties indeed lay in my way, of extraordinary magnitude, which prevented even the necessary attention from being given to my several statements. But when your respectable Society has set the example, and has been so good as to give my discovery a fair opportunity of proving its merits, I no longer fear its sinking into oblivion from *neglect*. Should it fail from the non-performance of my promises, (or rather boasts,) I have earned the ridicule I bring on myself.

The positions, indeed, which must necessarily be acceded to, before fiorin cultivation can be entered upon with confidence, are of such extraordinary magnitude, that I am not surprized the world should be astonished at my hazarding them.

The first is, That man has for five thousand years been cutting grafs crops as winter provender for his cattle, without discovering what part of the grassy produce was best suited to his purpose.

The second, That Nature has been for the same time unremittingly employed in obtruding upon the notice of man this the most valuable of the grassy tribe, indeed by far the most valuable *indigenous* vegetable with which she has favoured our islands ; and yet that, at the end of that period, she had not succeeded. I have on different occasions already stated many instances of these obtrusions, and shall now recapitulate some of them.

Where uninterrupted, this grafs is perpetually pressing itself forward. If the gardener did not interfere, you have not a gravel walk in England which florin would not occupy in September and October ; shooting its strings (*stolones*) across them. Florin is luxuriant in every bog, mire, and morass in this kingdom ; and I venture to say in England. And I found it myself as abundant in *Scotland* (where I went for the purpose) as in *Ireland*.

I have examined the summits of several of our high mountains, and always found it in possession.

Wherever a portion of ground is by any means laid bare, florin is the first grafs to occupy it.

I have quoted the letter of a noble Correspondent, in which his Lordship informs me, that he had the day before pointed out to several friends on *New-*

market Race-Course a fiorin string, shooting across (its mode of taking possession) a bare spot of ground, whence a sod had been raised.

I have quoted also the authority of friends of equal rank, to establish instances where spontaneous fiorin had taken possession of neglected roads in both England and Ireland; and particularly of a *turnpike-road* which had been closed up in consequence of a new line. In our poorest, shallowest, dry grounds, and barren lands, we find its panicles, when no other grass can shew itself.

I shall take the liberty of quoting a passage from a former essay of mine, printed two years and a half ago, and intended as notes and comments on my first Memoir on Fiorin Grass, published in the Transactions of the Board of Agriculture.

“ I have hitherto omitted mentioning a property
 “ of fiorin grass of some curiosity. Its panicles
 “ stand through the year undefaced, while those of
 “ all other grasses soon disappear.—Is this accident?
 “ or is it rather the kindness of Nature, endowing
 “ this valuable present of her’s with a property, by
 “ which she points out to man, that it will thrive in
 “ places of various description, which have not as
 “ yet called forth his exertions ?”—“ Very late in
 “ last April I travelled through much wild country
 “ in a geological pursuit; and I venture to say, that
 “ in every twenty yards I found fiorin panicles in
 “ high preservation.”

I could support the truth of my *second position* by innumerable instances in these islands. I shall now proceed to other kingdoms; for while this inestimable grass is thus scattered profusely by nature over a very great variety of soil, and every elevation, in our own country; she seems to have been equally liberal of it to all other regions, and to have endowed it with the faculty of accommodating itself to all climates.

A Reviewer attacked me, on the supposition that I did not know that the *agrostis stolonifera*, the Irish fiorin, throve in *Iceland*.

My friend General Macan, now commanding the cavalry in India, authorizes me to say, that the fiorin he saw at my house is the celebrated *Doob grass* of India, on which their horses are almost exclusively maintained in that country: and the General, with other India friends, assure me, their mode of laying it down is precisely the same with my own. A medical gentleman from this country, settled in Madeira since I brought notice on fiorin, writes home that this grass abounds in Madeira.

I shall quote a passage from Bartram's Travels in East-Florida in 1791.

“ The swamps on the banks and islands of the
 “ river are generally three or four feet above the
 “ surface of the water, and very level; the timber
 “ large, and growing thinly. The black, rich earth
 “ is covered with moderately tall and very succulent

“grafs, which, when chewed, is sweet and agreeable
 “to the taste, fomewhat like young sugar-cane. It
 “is a *jointed decumbent* grafs, sending out radicles
 “from the joints into the earth, and it spreads itself
 “by creeping over the surface.”

Could fiorin grafs be more accurately described? Succulent and saccharine, emitting *stolones*, and found in the very situation where we should have met with it here. The thinly-scattered trees injuring other vegetables, while fiorin is unaffected by shade, when not very thick.

The *Jamaica grafs*, imported to Madras by the late Sir Archibald Campbell, and so strongly recommended by him, if not fiorin, at least is *stoloniferous*; and it is upon the *stolones* of grafs I am labouring to bring attention.

Any notice hitherto taken of fiorin grafs seems to be for the sole purpose of reprobating it. Agricultural writers let themselves loose against it with a venom that could scarcely obtain credit, had we not their books before us.

Equally ignorant of the *gifts* and of the *plagues* which nature mixes up for us, they confound *fiorin* with *couch grafs*, though they bear no resemblance to each other. Our favourite is a production of the *surface*, which would rise erect, was it able to support itself; and which climbs, when it finds any thing to assist it.

COUCH GRASS (*triticum repens*) is pure root, runs horizontally *under* ground, much interfering with the roots of our crops.

FIORIN STOLONES, running along the surface, send little radicles from their joints *down* into the ground, by which they extract fresh nourishment, that enables them to attain their great length.

COUCH GRASS, from its long horizontal roots, sends *up* at intervals, *through the surface*, sprouts, which soon turn into harsh culmi, generally with panicles interfering with our crop *above* the ground, as much as its long strings did with the roots *below*.

Not content with directing the attention of their readers to a wrong and odious object, by confounding *names*, they point their abuse direct against fiorin itself (*agrostis stolonifera*); and, in their careless ignorance, fasten upon its most prominent excellence, the strong predilection of every species of cattle for it. Unhappily too for the credit of these gentlemen, of all the good qualities of the *agrostis stolonifera*, this is the most easily ascertained by those who will take the trouble of trying.

The experiment is made by every stranger that comes to my house. I send *himself* to my rick for a handful of my best hay; his horse readily eats it: he then gets fiorin, which he also eats. He is then tried again with the first. No, no more of that;

he looks about for the fiorin, and no effort can induce him to recur to the former.*

The case is the same, if the grasses be offered while fresh cut. My children amuse themselves by laying a bundle of green fiorin on the ground, and covering it up carefully with *other* fresh cut grass. A cow is then turned loose to it ; she instantly, by the smell, discovers the trick, tosses off with her horn the upper grass, and falls greedily to the fiorin.

Hear these agricultural writers themselves. One tells us, “ it is of that coarse nature that no cattle “ will touch it.” By another it is enumerated under its own name, *agrostis stolonifera*, among the grasses not eligible for cultivation. The author proceeds : “ There is no species of *agrostis* that cattle are fond “ of ; and as they are generally avoided by cattle, “ there is no reason to believe that any of them “ would answer as hay.” A third tells us, “ any “ sort of stock would starve, rather than touch the “ herbage of the *agrostis stolonifera*.”

* Since I had finished this memoir, a letter from a respectable Member of the Bath Agricultural Society informs me, that this error is still persisted in by many ; I am therefore driven to the necessity of accumulating all the proofs I can. My two friends, Dr. Bruce and Mr. Joy, made the same experiment with much attention, but with a different result. They chose some of my best *common hay*, and tendered it first to a horse, then to several stalled cows : all these rejected it, after slightly smelling to it ; they at the time all living upon fiorin. My friends then tendered the same cattle a bundle of fiorin, which they every one ate freely of.

The luxuriance of the fiorin so obtrudes itself, that even these gentlemen could not overlook it. One tells us, " Though the crop is exceedingly thick on the ground, it is perhaps not eighteen inches high." Another says, " His field had run to *agrostis stolonifera*, so that to walk upon it was like treading on a cushion." And a third, " A stranger is often astonished at the apparent luxuriance of this useless grass." He then exclaims, " Of what importance it would be to discover a grass that might thrive as well as this, and at the same time afford nutritious food for our cattle!"

After these, and abundance of similar tirades, am I to be surprized that the world should be slack in taking up (on my recommendation) the culture of the *agrostis stolonifera*. These lecturers in agriculture were satisfied with copying from their careless predecessors, never troubling themselves to study nature.

Not so the Poets. These gentlemen were aware that excellence in their line was unattainable, without a thorough knowledge of nature and her productions; we do not find them suffering fiorin and its properties to escape them.

The elegant WALTER SCOTT shews that he knew fiorin well under the name of *Knot Grass*; for it is nature, not names, that should engage our attention.

" The Knot Grass fetters here the hand
 " That once could burst an iron band."

Could a better description be given of a *fiorin stolo*, running along the surface, rooting from its knots or joints, crossing the bone, rooting at the other side and fettering it to the ground, as the Lilliputians served Gulliver? Is this a description of couch grass?

GOLO GOCH too (as quoted by Mr. Pugh, so well versed in Celtic literature) celebrates the verdure and luxuriance of the *fiorin grass*, in the parks and inclosures of OWEN GLENDOWER, whose bard *Golo* was.

I have indulged a wild conjecture on the cause why this grass should be known in some parts of our islands, and overlooked or misrepresented in England.

The Scotch and Welsh, it appears, know it; and I myself never questioned a native Irishman on its subject, who was not perfectly acquainted with the fondness of his cattle for *fiorin grass*.

The unequal dispersion of the *fiorin grass* may be a matter of curiosity. We may be surprised at the deviation of nature from her usual rules, in accommodating one favourite vegetable to all *soils*, all *altitudes*, and all *climates*. But the real and important question before us is, as to its value; for what avails my repeated boast, that *fiorin* grows spontaneously, *and of course may be cultivated* in every acre in the united kingdom, unless I shew at the same time that its crops will fully reward the labours of its cultivator.

To effectually establish the truth of *my first position*, my proof must not merely be *positive*, but also

comparative: simple value, is not enough; I must convince the agriculturist of its preference, and that he will find his interest in abandoning the *culmiferous* produce he has hitherto been used alone to save, and look, to *stoloniferous* produce, with due attention to the difference between the *habits* and *periods* of such a dissimilar stile of crops.

Upon this point of value I have dwelt much at length in different Essays; some of which I have taken the liberty to present to your respectable Society.

In these I have established, by such a mass of evidence as has rarely been brought together, all the prominent good qualities of this favourite grass of mine. The great superiority of its hay over all others in quality; the immense produce it gives, running from *five to seven* and even *eight tons* to the English acre: and now becoming by practice better acquainted with it, and having carried my culture of it into more favourable grounds, I have boasted that I hope next year to reach ten tons.

The superiority of this grass over all others is preserved in many circumstances of no small importance. Facility of propagation; facility in the transmissal of its prolific *stolones*; no trouble in saving or storing them, they remaining where they grow until wanted for use. And where the speculation is hazarded, of reclaiming immense tracts, facility in procuring stock of plants or strings to any amount, however enormous.

I stated a year and a half ago, in a letter to my friend the Earl of Roofs, on reclaiming the Bog of Allen, that, with a reasonable notice, I should engage to find *stolones* sufficient to lay down one thousand acres. I add, what is of much importance, rapidity of growth, that is, quickness in acquiring value. I have at different times laid down fiorin in April, and once on the first of May, and mowed a fine crop that season. My neighbour Mr. Ryan laid down in March last three roods, and has now (January 4th) standing the best *first* crop of fiorin I ever saw: did he not mean to use it as green food, I venture to say it would produce six tons of fine hay to the English acre.

I may be told I put forward the good qualities of this grass with too great confidence, and dwell so much on its excellencies as to overstrain belief. But let it be remembered, that every one of these good qualities is full in my own view, and that I have for years been calling upon the world even with importunity, to come and witness the facts I was perpetually laying before them on this subject.

The *Scotch* accepted my challenge, and on the 14th of January last sent over a gentleman from Dumfriesshire with letters to me. He had no other object but to inspect and report upon my proceedings, and particularly to see if I actually would mow on January the 15th, as I had promised to do.

On his return home, this gentleman published a minute account of what he had seen, with high en-

comiums on fiorin, and very particular instructions for its culture, which I had given him. And also be it remembered, that I have not limited myself to a contracted stile of experiment, forcing, by attention and manure, small patches into great luxuriance; but that I have carried my culture of fiorin into extensive practice, that I have laid down at Clonsfelle twenty-one acres with it, and three at Portrush, all presentable and perpetually inspected from all quarters. Nor does distance preclude conviction being carried every where to those who are desirous of obtaining it.

Fiorin does not (like some of our best grasses) grow in tufts; its thick fleece is formed by a vast number of *stolones*, distinct from each other, falling down and covering the surface with great uniformity. Hence with ease a sod may be raised with its *stolones* as they grow, and transmitted for a specimen of the whole meadow,—*ex pede Herculem*.

Specimens of this description are already on their way to the Bath Agricultural Society; they shall be followed by others, not merely for the gratification of curiosity, but also to serve for the purposes of propagation; as when the sods are torn to pieces, weeks or months after exhibition, every single string will become the parent of a fiorin root from every one of its joints.

In September 1808, I inclosed to a Noble Earl in the north of Scotland two such strings in his own frank. In thirteen months his Lordship wrote to

me that they had so multiplied as to enable him to lay down two acres. Experiments may be made on fiorin grafs on the most diminutive scale. A plot in a garden a few feet square, will be found sufficient to exhibit the luxuriance of a fiorin crop, the number and length of its stolones, with the predilection of all cattle for it. Even the citizen limited to his street is not precluded from satisfying himself of the powers of fiorin ; he, like his brethren, is probably casting a longing look forward to rural occupations, in a more airy and more roomy situation. At present he has only to plant a fiorin root in a small flower-pot, and set it on his window stool ; this will soon emit numerous *stolones*, which will hang down into the street in great luxuriance.

My friend Mr. Dickinson, a member of the Bath Society, asked where he should find fiorin, I having boasted it grew spontaneously in every square perch in England. I replied, go to the *north wall* of your parish church, pick up the roots of grafs in contact with the wall. Mr. Dickinson did so, and enclosed to me a small root under his frank. I put it in a little pot in my hot-house, where it soon vegetated, and proved its species, by emitting some *stolones*. In summer it was put in the shade with other pots, and no more thought of for six months, when a new gardener brought it to me to know what it was. I then counted sixty-seven *stolones* ; great numbers of which had, when in the shade, reached to the

ground, and run along it rooting. I enclosed two or three of them to Mr. Dickinson, that he might compare his own better travelled fiorin with what I had sent him before.

The last property of fiorin I shall mention, in which it deviates from the habits of all other grasses, is the pertinacious hold it keeps of the ground, each successive year becoming the more exclusive possessor.

Every grass I have made experiments upon, exhibits its greatest luxuriance the first year; as it advances, obtruders mix with it, and the original grass seems poorer, more exhausted, and soon loses even its predominance.

Fiorin, on the contrary, improves for some time every successive year, and becomes the more exclusive possessor: its *stolones*, it is true, abate in their length, but so increase in their number as to give a greater crop of hay.* I have this moment standing in my field

* After the above was written, my two most respectable friends, the Rev. Dr. Bruce, and Henry Joy, esq; came from Belfast to visit me, and inspect my fiorin. Availing myself of so good an opportunity to ascertain the comparative value of fiorin crops, of different ages; and anxious to comply with the wish of your Society, which, at your annual meeting, expressed a strong desire to be informed, "with all possible accuracy, of the quality of hay made from fiorin;" I requested my two friends to attend to this point: who, after most careful examination, gave a decided preference to the hay of the *fourth* year (my fifth plot was expended) as being finer and more delicate. I must here observe, that the coarseness of the long *stolones* of the *first* year seems not to be attended with any inconvenience, the long strings soften while passing into hay, and I never saw the cattle reject a *stolo*, however coarse.

most luxuriant crops of the *third* and *fourth* years, and a few weeks ago I mowed the *fifth* crop, and a most abundant one, from the first plot I laid down.

Where is this to end? May I not say never? The cause is obvious; fiorin crops *renovate themselves*, the *stolones* rooting at the joints as they run, are perpetually forming a succession of new roots, replacing the old ones as they wear out; hence a fiorin meadow should last for ever.

“ Et dubitant homines ferere et impendere curam.”

Such are the properties and excellencies which have induced me to persist in pressing fiorin culture on the notice of the public.

Most of these positions have been combated, and I am always ready to reply. I must here observe, that those alone have a right to make objections, and to raise doubts, who have also made careful experiments. I do not find this to be the case with any of my antagonists; therefore, in the present state of the controversy, *theory* is set up in opposition to *practice*, and *opinions* brought forward against *facts*.

I proceed now to a property of *stoloniferous* crops, (at least those of *this agrostis*,) my mention of which has excited much ridicule against myself, and I have reason to know has greatly impeded the progress of fiorin culture; I mean the hardy, vivifying nature of these *stolones*, which enables them to be kept *as hay* through the whole winter, with as much facility as culmiferous crops are saved in the height of summer.

This strange paradox, the truth of which, through the winters of 1808 and 1809, I had called in the most public manner on the world to witness, I have established in this (the winter of 1810) on a *great scale*; for not content, as before, with mowing frequently and regularly small portions through the season, I have this winter exposed my *whole* florin crop (above thirteen acres) to the severities of brumal weather with the most complete success.

In the essay of mine, which I am told brought the attention of the Bath Agricultural Society to florin grass, I proved, upon philosophical, principles the radical and essential difference between *culmi* and *stolones*. In the former, the life of all parts of the plant is connected indissolubly with the root, and annihilated by the stroke of the scythe: in the latter, the principle of life, unconnected with the root, but permanently vivifying every part of the stolo equally after as before severing.

Hence the radical and essential difference between *culmiferous* and *stoloniferous* crops. The former dead inanimate matter, hastening like all organized substances, when deprived of life, to putrefaction, through a previous stage of fermentation. The latter, animated in all its parts by the principle of life, and by the power of that vital spark, effectually resisting *fermentation, putrefaction, and also evaporation.*

I have in other essays fully established *the fact*, that life is most pertinaciously preserved in the *solones* of fiorin many months after they are mowed, made into hay, and stored in house or rick. I have shewn that the effects I have stated, as derived from the retention of life, are conformable to the doctrines of some of our most able modern naturalists.

To this principle of life may probably be ascribed the diversified habits and properties of these inestimable *solones*, and among the rest their uninterrupted vegetation, and consequently their perpetual increase in quantity of crop. I had so fully satisfied myself of the certainty of increase, that I determined to avail myself of it to the utmost, even at the hazard of my whole fiorin crop of 1810.

I shall now detail my proceedings of this season, which were carried on with great publicity. Perhaps I may encourage bold amateurs to follow my steps into this new and untrodden field, and to reap their share of the advantages to be derived from these valuable *solones*, which seem to be increasing upon me every moment. While the more timid agriculturist, who wishes to derive *some* benefit from fiorin luxuriance, but who will not venture a *winter campaign*, may, by a watchful attention to *facts* and *dates*, fix upon his own *ne plus ultra*, and decide upon the period, beyond which the promise of a great increase of crop shall not tempt him to carry

his old practice of hay-making into a season hitherto deemed ill adapted for such operations.

My Portrush crop (about three acres) was very fine; and on the first of August, as I found my old stock of hay would not last until October, I was obliged to mow some to have a supply ready. I mowed thrice in August, my neighbours admiring the excellent hay, and wondering I would not cut it all.

On the third of September a Noble Marquis, with whom I was in correspondence on florin subjects, came from a considerable distance to see my crop, and was astonished at its luxuriance; particularly that of my oldest portion then bearing its *third* crop, but which an English gentleman, two years before, had pronounced to be couch grass.

Not having myself so much courage then (1808) as I have since acquired, I had mowed its first crop August 26th; the affidavit of the mower was published, deposing it to be the best crop he had ever cut; and the certificate of the magistrate annexed, asserting that the quantity seemed double what was usually had on so much ground.

On the 11th of September, 1810, I began to mow what remained (by far the greater part) of my Portrush meadow, allowing the rest of the month for saving, storing, and selling the crop, so much at least as I did not require for myself. Many came to see it; and found the hay so excellent, that

whatever I could spare was immediately engaged at any price.

I think I am secure that my timid friend will continue with me at least so far; but to encourage him to proceed, I must tell him that on the 11th of September fiorin crops have not yet reached half their quantity of produce. He must now follow me to Clonfeel, where, early in October I found, my $13\frac{1}{2}$ acres of fiorin meadow in strong vegetation.

On the 8th, I began to mow such parts of my crops as were likely to be adulterated with falling leaves; and on the 15th (my usual day,) what was to compose a rick of hay for my sheep in winter.

I shall not ask my cautious friend to follow me any farther; but lest he should think of deserting me *sooner*, I must assure him, that until October 15th he is perfectly secure of saving fiorin in his *own way*; and that his advantage will be very great in delaying so long, as the highest paroxysm of fiorin vegetation lies between the 11th of September and the 15th of October.

I now proceed with my bolder friend alone,

“Invitat genialis hyems;”

And shall resume my own proceedings, which I think will encourage him.

Having cut down two acres and a half in October, I took up the scythe again November 10th, and mowed above an acre, shaking it out and putting it

into lap cocks the day it was mown ; giving up all thoughts of accumulating it into larger parcels, being perfectly aware there was not any occasion.

November 20th, a gentleman from *Flintshire* arrived, sent over for the sole purpose of inspecting my proceedings. The weather was unusually wet ; but to satisfy him I mowed in various places, and particularly one portion he selected to ascertain quantity. As he wrung the water out of it, he shook his head.*

I have reason to think the gentleman was highly gratified by every thing *else* he saw, particularly the luxuriance of the crops still standing on peat mire, so wet and low as to be utterly unfit for any other culture ; but as he meant on his return to publish his report, I shall leave him to speak for himself.

From November 20th to January 1st, I mowed at intervals (as I caught a dry moment) two acres and a half ; finding it prudent to have a stock of lap cocks before me, as I think the food better, and preferred by my cattle, when it has stood some weeks.

I shall probably mow about two acres in January, and the remainder of my crop, perhaps five acres, the first dry days in February, reserving what may be necessary for green food to my milch cows.

* When I had reached so far, I dropped my pen, and went to the field, (January 4th,) to examine *these* lap cocks, and found them in the same state with those described by the Earl of Gosford and Lord Viscount Northland two years ago ; deep covered with snow, and the hay under it in the very highest order.

These last mowings I have a certainty of saving with the greatest ease ; for when it shall have stood three, or perhaps four weeks, in lap cocks, the days will be so much lengthened that we are sure of dry weather to enable us to accumulate our lap cocks* into larger packages, shake cocks, or tramp cocks, in which they will without suffering abuse by weather, remain until wanted for use or sale.

It may now be asked, *cui bono*, what advantage is to be obtained by throwing our hay harvest into a season so ill adapted to the purpose, and changing the food of our cattle from dry, well-saved hay, to an amphibious sort of a mass, neither green foil nor hay. I reply, first, that I feed my whole stock on hay, which never puts me to the expense of making or storing, or accumulating into ricks.

I do not press this advantage farther than to say, it more than compensates for the loss we sustain by having some part of our work thrown upon short days and bad weather. The grand benefit derived from our late periods of mowing lies in the great addition of quantity acquired by delaying us, so long

* Left our terms should not be understood in England, I shall explain them.—*Lap-cocks* mean a quantity of the sward, or hay, from ten to fourteen pounds weight, gathered up into a spherical form.—*Shake cocks*, as great a quantity as can conveniently be accumulated by hand, without treading, and held together, by a rope thrown over; these run from 200 to 350 pounds.—*Tramp cocks* signify a much larger portion; upon which a man ascends, disposes it, and treads it down by his weight: these run from 1000 to 1500 pounds.

as prudence will permit, to sever a crop in uninterrupted increase.

Before the present snow came on, January 2d, all my standing fiorin was in high vegetation. I have stated, above two years ago, an experiment I made on this subject along with my friend General Trotter. I shall take the liberty of quoting the passage.

“ December 28th, the day I housed my first crop,
 “ mowed December 7th, I took three or four of
 “ its strings indiscriminately. I laid them on the
 “ surface of a flower-pot, sprinkled them lightly with
 “ mould, and put them in my hot-house; they soon
 “ vegetated, and in three weeks the pot was covered
 “ with a fine green fleece. Observing one sprout
 “ unusually large and strong, I pulled it up, and
 “ found it was the projecting point of a string. This
 “ fact seems of much importance; as it proves, that
 “ when the string was cut December 7th, its length
 “ was still increasing, and of course with it the
 “ quantity of the crop; a point not easily deter-
 “ mined in the field, on account of the matting of
 “ the sward.”

Now as the fiorin crop consists of *stolones* only, can we doubt that when vegetation is uninterrupted, that these *stolones* are always on the increase, and of course the quantity of the produce? And by two years further experience, I find vegetation continues far later than December 28th.

I am satisfied that, *communibus annis*, fiorin crops gain one-third after October 15th; and this year *more*, as the drought of September had retarded their growth, though that of May and June had little effect. And as to saving these crops through the whole winter, careful experiments for three years had so convinced me that fiorin lap cocks could not be injured by any violence or continuation of bad weather, that I did not hesitate this season to trust my whole crop to that experience.

It may be supposed, that these lap cocks require perpetual attention: by no means! This proved the wettest, at least the dampest winter, I remember, yet my lap cocks were but twice touched between the 12th of November and the 1st of January. At these times, indeed, after severe storms, I thought it prudent to set them up: a man ran through the field raising and loosening each; then in half an hour he tightened them up, restored their spherical form, and narrowed their bases: thus he went over an acre in an hour and an half.

January the 1st, a brisk dry day came on, which enabled me to put as much hay into my lofts as I could venture to accumulate.

I cannot too often repeat, that these lap cocks had stood through the worst of the winter in the face of the world, when curiosity was much excited by the novel practice, and the attention lately brought on the fiorin subject. And also, that these facts (so

contrary to all former experience) are in perfect conformity with sound theory : as I have fully proved in other essays, that *stoloniferous produce* ought from its nature to withstand all the hardships to which I have exposed it, the principle of vegetable life protecting it from fermentation and putrefaction, into which *culmiferous produce*, similarly circumstanced, we know would instantly run.

When I first discovered and established this property of *stoloniferous* crops, I considered it as a subject of much curiosity in a philosophical point of view, but did not look forward to it as leading to utility.

I stated the *only* advantage attending it which *then* occurred to me; to-wit, that we might now lay off a larger portion of fiorin meadow for winter green food, as we were secure, had we left too much, that we might convert the overplus into hay, which in common *culmiferous* crops would be quite impossible.

But now a more extensive field opens to my view, I foresee great advantages from deferring to sever our *stoloniferous* crops to the very latest periods.

I pause before I venture to lay these advantages before your respectable Society, as they lead to strange innovations in rural economy, to a stile of food for our domestic cattle hitherto unthought of. New measures must have had a beginning ; little (if any) of the food of man in these islands is drawn from indigenous vegetables.

The case with our cattle is partly the same. We can trace the progress of *Lucerne* from Media to our own country: *Sainfoin* does not belong to us; and the esculent roots on which we now feed our cattle much in winter, are mostly of recent introduction. The value of each of these must have been ascertained by patient experiment, before they could get into use.

Your Society has been pleased to encourage experiments on an indigenous vegetable of our own; from the cultivation of which I have promised no small advantage.

Every thing now seems in its *proper course*; your countenance will induce amateurs to make experiments, your bounty will stimulate to greater exertions; while I, as called upon by your Secretary, shall through him furnish the necessary materials, and the necessary instructions. In the mean time I am pushing my own experiments to the greatest extent my powers can reach.

The *value* of fiorin *stolones* cut through the winter, and preserved in lap cock *only*, is the question now at issue; and I am endeavouring to ascertain the policy of the practice. My former experiments upon them reached no farther than my milch cows; and their good effect on my milk, butter, and cream (as I have stated to the public before) was most decided.*

* As the richness and flavour communicated to milk by any particular species of food is a point of the highest consequence, I was glad to avail myself of the testimony of Dr. Bruce and Mr. Joy,

I proceed this winter on a grand scale. My whole stock of all descriptions, about fifty head, (exclusive of sheep,) are fed upon fiorin lap cock, in the place of their usual hay. My carriage horses alone get half and half; and I declare, upon my honour, I never remember every part of my stock at this season in such good condition.

I shall state one particular instance of the success of this food.

My family remaining behind me at the sea, a carriage horse was sent home to me, October 10th, in bad health, and low condition; as he was utterly unfit for work, I was desired to send another in his place. I put him, when he came, on fiorin food, half the oldest lap cocks I had, half those but a few days cut. He recovered quickly; in one month was able to return to his usual work, and through the winter has continued in as good order as I remember him; a more rapid recovery of flesh and strength than I ever witnessed.

who indeed suggested the idea themselves, on seeing my little boy's supper brought into the room. The gentlemen tasted his milk, and immediately pronounced *that cream had been mixed with it*; we sent to enquire about it, and were assured it was the milk whence the cream for evening tea had been skimmed. Mrs. Richardson went to my dairy, examined the pan, and confirmed the account we had received; but my friends were not satisfied. Next morning, having desired to be called when the cows were milking, and taking a bowl with them, they held it to the cow they found under the operation, and saw it filled. The richness of this little portion, which stood in my parlour the whole day, effectually removed all doubt.

Should fiorin be found to answer as good winter food, in the stage I have used it, the benefit is incalculable; for I have proved that the quantity of produce far exceeds what we can raise in the usual way, and also that great crops can be had from grounds unfit for any other culture. A sort of pool or morass, formed in the place whence the clay had been raised sixty years ago for brick to build my house with, and which for fifty-seven years had served only to afford coarse soil to the horses bringing home turf to my predecessors and myself, now cultivated with fiorin, produces a crop double, or more likely treble the value of that growing on so much ground in any part of the united kingdom: this little patch is in a very ostensible place.

One important advantage that accompanies fiorin in every other stage, follows it also into lap cocks; that is, that experiments may be tried upon them on the very smallest scale. Theory too comes in aid of practice; fiorin of some weeks standing, less loaded with aqueous fluids than common green soil, less exhausted by evaporation than common hay, retains its less volatile and better concocted saccharine juices, of course *should* be more nutritive and more fattening, as I have strong reason to believe it actually is.

It is not necessary for me to proceed to give instructions as to the mode of cultivating and laying down fiorin grass. The essays I have directed to be presented to your Society are full on the subject,

particularly two; one addressed to the Marquis of Hertford, the other to the Earl of Aberdeen, and printed by these noblemen for the use of their friends. Also a third letter, addressed to my much-respected scientific friend G. B. Greenough, esq; M. P.; who, together with our common friend the celebrated Mr. Davy, was with me at Portrush when I discovered the first fiorin *folio*; and who were so good as to communicate with me on the modes of ascertaining the properties and value (should it appear to have any) of this (to us a new) production. An auspicious commencement of a pursuit, in which I have persevered with unremitting diligence for five years, soon aware of the incalculable benefits to the agricultural world it was leading to.

Though the discovery of these *folones* appears accidental, yet I had been for some months cultivating fiorin at Clonfeele, with all other grasses I had heard or read of, or observed *myself*, as promising *valuable* produce.

It may be an encouragement to amateurs to know that I have not been led by a fiorin *mania* into a desultory solitary pursuit. I was some years engaged in making experiments on grasses, before I added fiorin to the number of those I was cultivating.

The fact was, that having exhausted the geological topics into which my vicinity to the *Giant's Causeway* in summer had engaged me, and having given my ideas on these subjects to the world in several

memoirs published in the transactions of different literary societies, I engaged in agricultural studies and pursuits. The grasses early attracted my attention; and conceiving that department had not been cultivated by those who had written on its subject, sufficiently with a view to the benefit and instruction of practical farmers, I laid off the *pure gramina* as a distinct pursuit, to which I determined to limit myself, pointing my attention to *utility* alone, leaving the varieties and distinctive marks of this numerous tribe to be discussed by scientific botanists; I being rather desirous to *contract* than *extend* my field, and resolute to lay nothing before the agriculturist but what it might be useful to him to know.

In some of my Essays, a desultory mention of the high opinion I entertained of the *dactylis glomerata*, brought me the honour of the correspondence of a Noble Duke, well known in the fields of agriculture.

At length, after seven years occupied in careful experiments, I threw the result into a memoir, *on the Natural History of Grass in general, and particularly of such Grasses as I deemed worthy of cultivation*. This Memoir was approved of by the Royal Irish Academy, and is printed in their Transactions. Fiorin I omitted, having given it publicly otherwise.

Of all the grasses, I had formerly esteemed the *dactylis* the first, but now only next after fiorin.

“Proximus huic, longo sed proximus intervallo.”

In the Memoir I mention I was particular as to the natural history of the *daçtylis*, and in the observations and experiments, the result of which led to the good opinion I entertain of this early and luxuriant grass. That Memoir, together with one on *Irrigation*, and another on the *Culture of Salt Marshes*, I shall take the liberty of presenting to your Society by the first opportunity: they, with others, being printed at my own suit, for the use of my friends.

Before this paper was closed up, a second inspector from Dumfriesshire arrived, Jan. 15th. I went with him through my seven acres of meadow still standing, and found all perfectly safe, in high vegetation, and rapidly increasing; the *stolones* as green as in October.

W. RICHARDSON, D.D.

Moy, Ireland, Jan. 15th, 1811.

IN the course of the Correspondence between Dr. Richardson and the Superintending Committee of the Society, the following Queries were proposed to the Doctor, which he obligingly replied to. It is presumed, that to subjoin them here will be an additional gratification to the reader.

Query 1st. Dr. Richardson states, that on January 15th, a brisk dry day enabled him to put as much hay into his lofts as he could venture to accumulate.

What evil consequences did he dread by putting more? Was he afraid that, not exposed to the atmosphere, but inclosed within a roof, the hay would receive any and what injury? Or, if he had put more, what was he apprehensive might have been the consequence?

Answer. *I am happy to transact with curious amateurs by interrogatories, a style I can rarely bring my correspondents to adopt.*

In saving forin hay at our late season, internal succulence is little dreaded, external atmospheric moisture our sole enemy. In the middle of winter evaporation is faint, and unable to carry it off; therefore, January 15th, I knew it could not be well dried, and would only venture a load or two near the door of each of my hay-lofts for immediate use. I dreaded, 1st, previous rotting. My memoir, as I recollect,

gives a minute account of the escape of my forin crop after running from the greed of late growth into a season too late, and then instantly encountered by the wettest winter ever remembered. It is instructive, so far as it shews forin powers to the utmost ; but it is not to be imitated.

Query 2d. Does Dr. Richardson ever recommend, as a preferable practice, the collecting forin hay into large ricks or mows ? or does he think it the better plan, to keep it subdivided into hay cocks, wind cocks, and grass cocks, equivalent, or nearly so, to the Irish terms shake cocks, tramp cocks, and lap cocks ? Would it in consequence injure the plants on which such cocks would stand ?

Answer. I have ascertained now, that forin is saved, and stored for future use, with more ease and certainty than common hay. This query is best answered by a statement of my hay measures last season ; my Memoir stating that of the preceding.

I commenced mowing October 1st, and through that month mowed nine acres (very weighty) for winter use. The hay was put, when safe, into tramp cocks, probably containing 1200 lbs. each. I conjectured that sixteen of these, standing in a field very convenient to my house, would cover my consumption of dry hay until January, and be brought in for use as wanted. I attended myself when the two last were taken down, December 28th, and observed they produced neither

refuse tops or bottoms ; that their surfaces were not abused or bleached by exposure to the weather ; nor the fiorin grafs under them injured, there being no putrefaction at their bases.

I shall leave a much larger stock in tramp cocks in the field next winter.

About the 12th of November, I began to accumulate the remainder of my fiorin hay into ricks in my yard with some fears. I ordered the links or parts of my ricks to be made very short, that we might run them up quick ; and that should heavy rain come on, only a small surface should be exposed. This happened once ; and the wetted hay, eight or ten inches deep, was put into lap cocks in the contiguous field ; and so soon as a dry day enabled us to proceed with the rick, this too was dry soon, and brought back to the rick. Until February 10, I did not touch my common hay ; living entirely on fiorin, and never found my cattle in better order ; a part of one fiorin rick shall be reserved for next winter.

Query 3d. As the plants every where with us (spontaneously produced) are frequently, in July and August, very prolific of seeds, may it not be apprehended, that the maturation of such seeds (as in all other cases) will injure and retard the growth of the plants, as they proceed therein for winter consumption ? If so, might it not be eligible to attempt the taking off their panicles with a very keen scythe,

before such maturation proceed? Or, can there be any objection, could an eligible mode be discovered, to the gathering the seeds, when ripe, for future propagation?

Answer. *Speculating, as you do, I clipped off the panicles of fiorin from different patches, but the stolones issued fewer and weaker, and the crop was injured. Semiramis's invention may have had its uses in the animal kingdom; but vegetables, it seems, must have their natural course. No grass gives more seed, nor more easily saved. I gather every year for my seedsmen, to please and flatter his customers with; but seed will not do for practice. I decline propagating fiorin by seed; the young tendril is so small and slow of growth, that it cannot be protected (even in my small plots for experiment) from weeds, and still less from other grasses.*

It is known to botanists, that many of the gramina have a second production, called by them stolones, totally different from the culmi in their nature, their habits, their periods.

The discovery of which I claim the credit is, that the stolones produced by one of our gramina (the agrostis stolonifera) are by far more valuable to man than all the rest of the grassy tribe taken together. That unfettered by the restrictions to which the perishable nature of the culmi subjects its crops, our animated stolones, fortified by the incorruptible principle of life, brave seasons and weather, and preserve themselves

sound, when exposed to difficulties under which the culmiferous crops would rapidly perish.

Availing myself of my discovery of these happy properties, I lament the imperfection of the vegetable material, which alone you have been used to convert into hay; and spurning the limitations to which its nature subjects you, I mow my stoloniferous crops at the periods in which they have attained their perfection, and when they are most conveniently applied to my use, without troubling myself about seasons or weather, neither of which have the power of disturbing me.

Availing myself too of the universality of this indigenous grass of the world, I conclude that wherever nature produces it spontaneously, it may there safely be cultivated by man, that is, every where, in all soils, climates, and altitudes. Confident in the truth of my conclusion, I have followed this grass wherever I had access; to the tops of our mountains, to our bogs and mires, as far, as Ovid says,*

————— “*Instabile terra, innabilis unda,*”

* *In April I shall proceed to the Moors of Galloway, where I have such reliance on the exertions of the intelligent and spirited proprietors, who place a confidence in me, that I pledge myself they shall this same year, 1812, mow from heathy and peaty moors, as yet untouched, crops of florin hay, double the value of the best crops in Britain. And should your countrymen chuse to follow the example of their neighbours, the moors in the north of England, the heaths and wastes scattered over so much of that country, the fens of Lincoln and Cambridgeshire, and even the sands of Suffolk, would soon exhibit a different aspect, and afford their proprietors a very different value from what they do at present.*

with complete success; and obtain from these hitherto unprofitable tracts crops of hay, double the amount of any yet mowed from our very richest grounds, and of far superior quality.

Query 4th. As in our turnip system, whereby we procure a necessary renovation of our worn-out arables, seventy sheep may be supported in a very superior way, and probably other stock proportionably, through the most trying season of the year, (namely, from the middle of April to the middle of May,) with the produce of an acre of any inferior land of the Lapland turnip, or as it is sometimes called, Turnip-rooted Cabbage: Dr. Richardson is requested to state his opinion on the comparative produce of an acre of each, the expense of these two crops, *per se*, being put out of the question; and what quantity of stock, and what way, comparatively with any other vegetable production, will it sustain during that pinching and trying month?

Answer. I must not be questioned comparatively. I deal in hay, winter green food; and since I was in England, I furnish abundance of green food from the beginning of September, when clover fails. I never broke up a perch once laid down with scurvy. My fifth crop was very fine this year; and I have a fine fleece on a patch bearing its sixth.

I know we all starve from the middle of April to the middle of May. I fear I cannot help you. I

confess I am trying ; but who will venture tricks with a crop which we know will in October produce six or seven tons of hay, far better than any other. At the late season you mention, you must estimate my dry hay against your own provender, whatever it may be.

I myself have repeatedly established my crop to amount from seven tons and a half to eight tons the English acre. Two new testimonies of much respectability, and in places remote from each other, and from me, have occurred this season. The Lord Bishop of Derry weighed a whole acre of his florin, and found it, when quite dry, amount to $7\frac{1}{2}$ tons ; and Mr. Naghten, representative for the county of Antrim, at my request ascertained, by the aid of a surveyor, that a portion of his meadow amounted to six tons eight hundred ; and is confident the whole meadow (four English acres) would have averaged fully to the same rate.

I shall be moderate, and estimate an English acre of florin at six tons only, but of superlative hay. This amount of hay you must compare for yourselves against the produce of an acre of your own, planted with any vegetables you chuse. This concession must not be quoted against me ; for was I to state what I thought a fair average for well-managed florin crops, I should say seven tons and a half ; and I have sanguine hopes that I myself shall reach ten tons.

Query 5th. At what age does Dr. Richardson consider florin to be in its greatest perfection ? As

vegetation seems never to cease in this plant, supposing that a field was mown in June or July, would it not be possible to mow the same ground in January for March hay? Would the second crop equal, fall short of, or exceed, the one crop reserved for winter mowing? What would be the difference in quality, if any, of the summer or winter crop?

Answer. *Never shall you get one bite from me in June or July. Be content with one swinging crop; that must pay for the want of aftermath. June florin weak, poor, and soft; succeeding crop spoiled. I have for two or three years established the practicability and facility of the measure. I am prepared this season to ascertain the prudence of it. I have reserved five acres of good florin. Two I calculate will be enough for winter green food. Three shall be mowed from the 20th of February. I am anxious for the result.**

* In a subsequent letter the Doctor informs the Committee, "*that result is fully ascertained, since he first remitted the foregoing reply to the Bath Society's queries.*" The Doctor then proceeds, "*I have some reluctance in stating it, lest I should revive incredulity; but as the measure was promised, I must report on its success.*"

"*I had engaged to reserve a considerable portion of my best florin meadow for February mowing, and March hay making, I began to mow Feb. 17, and shall mow three hours every day, until two acres be cut. I proceed thus slowly, to remain the longer time open to inspection. From the 17th to the 23d, much rain nearly every day, but the mowing never interrupted from ten to one o'clock; and the facility of making the hay far greater than I ever witnessed in July. The quantity of the crop much greater than in October; and its vegetation was powerful in November, and never entirely intermitted. The quality at least equal; every separate sward preserves its soundness, verdure, and animation, from the root to the point; while the*

You wish for specimens of my fiorin hay. I shall look anxiously for opportunities, and shall transmit to you two parcels; one, fiorin hay mowed in October, ricked in November, and remaining since like other hay. The second mowed February 17, saved and preserved like common hay. You put another query to me, what do I mean by the word hay? A question at this moment peculiarly apposite. By hay, I mean the produce of the gramina, so far dried as to bear accumulation into large masses, without heating or rotting; and thus preservable in a sound state, fit for use, for one or more years.

The severed produce of the gramina hitherto used by man seems to admit consumption to advantage but in two stages, fresh cut green foil, or dry hay.

But fiorin is consumable (as I have proved this winter) to a vast advantage in an extended intermediate stage, for which I have not yet found a name.

From the 1st of November, when I quit mowing for dry hay, I cut on, put the produce into lap cocks, and consume these immediately from the meadow, at various ages, from one to five weeks mowed, and so proceed until late in spring. This provender is not hay, but a most desirable and cheap food, which I am confident will be run upon to an immense extent, when its value shall be understood. I go much at length into the subject, in an essay on winter house feeding, now in the

few rotten leaves of weeds, other grasses, or its own envelope, instantly dissipate when the mass dries."

press, of which I will take care your Society shall have a copy.

At the conclusion of these replies to the queries proposed by the Committee, the Doctor avails himself of the opportunity to propose, in his turn, the following interrogatories to all persons who have manifested any hostility to his protégée fiorin.

“ Have any of you ever made a single experiment
“ on the grass, whose introduction you are so zealous
“ to prevent ?

“ Have you ever watched the success of experiments made by others upon it ?

“ Have you ever seen a fiorin meadow *mowed*, or
“ an attempt to convert its crops into hay, at the
“ season you disapprove, fail?

“ If you cannot give an affirmative answer to all
“ or most of these questions ; will you persist in
“ discouraging even experiments on the subject of
“ a discovery, at least of great promise ?

“ Do you not perceive that you are setting up
“ *your own theory* against *my practice*, carried on
“ for years in the face of the world ; that you are
“ opposing *your opinions* to *my facts*, authenticated
“ by the respectability of my country ?

“ Remember the old Saw,

“ *Publica lex hominum naturaque continet hoc fas,*

“ *Ut teneat vetitos incitias debilis aëus.*”

W. RICHARDSON, D. D.

Moy, Feb. 25, 1812.

*On the cultivation of dry Heaths, Downs, and
generally of Light Sandy Soils,
with Fiorin.*

[In a letter from Rev. Dr. RICHARDSON to THOS. GRÆME, esq; a Vice-President of the Bath and West of England Society for the encouragement of Agriculture, &c. wherein the Doctor has fulfilled a promise he had formerly made to the Society, of shewing them how such soils might be advantageously cultivated.]

TO THOMAS GRÆME, Esq.

Confecle-House, Moy, Ireland,

Feb. 4, 1812.

SIR,

I Have the honour of your letter, in which you request “ I would give such information as would
“ lead the Bath Agricultural Society right, in the
“ cultivation of dry heaths, downs, and generally
“ of all light sandy soils, with fiorin.”

Though very unwilling to withhold any information from the Bath Society, which has distinguished me in so honourable and flattering a manner; and particularly when their desire is signified through you, by whom I was introduced to the notice of that Society, and who have exerted yourself so strenuously, and so ably, to impress upon it, and the world, a favourable opinion of *me*, and my *protegé* fiorin

grafs; yet I hesitated for some time, before I could bring myself to encounter the descriptions of soil least favourable to florin.

In fact, my boasts of the aptitude of this accommodating grafs *for all soils* had been the occasion of greatly retarding its propagation; as it was too often first tried in these unfavourable descriptions, where knowledge of its natural history and habits were peculiarly required, to obtain for it such treatment as would enable it to overcome the difficulties and disadvantages of its local situation.

Frequent failures were the necessary consequence; and these throwing disrepute on florin, enabled its enemies (and you know it has many) to discourage others even from making experiments.

Hence I was unwilling to take any step that might lead to the introduction of this grafs, where skill and nice management were required for it, and where injudicious measures would infallibly be followed by disappointment.

But though unfavourable situations had too often indiscreetly and unfortunately been chosen for the commencement of florin cultivation, by those who could have afforded better soils; and sanguine expectations have been thereby disappointed; still there are many farms, and even extensive districts, where no other descriptions than those you mention are to be found. Are then the proprietors of these to be deprived of the benefits and conve-

niences to be derived from this new and valuable grass; merely because it *could* be cultivated to greater advantage in soils which they do not possess? Surely not. Let us then try if we can make them also participate of these benefits and conveniences, though no doubt on somewhat higher terms.

It will be an encouragement to these proprietors to know, that their *dry sandy* soils *ought* not to be deemed unfavourable scites for fiorin, since it is invariably found spontaneous and abundant in the very worst description of barren sandy soils.

We have this *fact* repeatedly stated by its enemies, as full proof of its unworthiness, since it selects soils where nothing else will grow.

This is poor logick, such as we are often unhappily misled by. The inference I draw from this *admitted fact*, is, that the *agrostis stolonifera* is a most hardy grass, able to encounter difficulties and privations fatal to the rest of its tribe.

The intelligent agriculturist, who looks to nature for his lesson, will probably not be satisfied with barren logical conclusions; but seeing this grass abundant in his most wretched soils, will, by studying its natural history and habits, try if he can avail himself in *practice* of the only grass that seems able to bear his unhappy soil.

Your proceeding is somewhat similar, but with better data; you *know* that fiorin is cultivated to great advantage on certain soils; and you ask

if it can be made valuable on other soils of less favourable description, and by what process?

It must afford great encouragement to the proprietors of these soils to know that this *agrostis* is found spontaneous and abundant on soils of similar nature, but of far worse description.

The inhabitants of these districts require hay for their cattle, not easily obtained from the common known grasses on such shallow arid soils; for all grasses of which we have been used to make hay, attain their perfection in the dry summer months; of course they arrive at their stunted maturity, after being abridged of the necessary moisture, at the very period when they most require it to throw them into luxuriance.

A priori, these gentlemen should expect better produce on their arid grounds, from a grass which, differing from all other grasses, is unlimited in its period of growth; and continuing to vegetate to a far later season, enjoys the full benefit of autumnal rains, with the certain moisture of later days and longer nights.

Our policy then must be, when we cultivate fiorin, in these unfavourable soils, to guard it from being parched up in the burning summer months, and to let it enjoy as much as possible of the more genial latter season, so favourable to its growth, and to the elongation of its stolones.

The first of these objects is easily attained, and the second is completely in our own power.

Relying upon these principles, I have repeatedly boasted, that I would raise valuable crops of fiorin on the barren Suffolk sands, and even on Bagshot Heath.

But you are not inquiring about possibilities, or the extreme extent of powers; your object is *real* and profitable *practice*, attainable on reasonable terms; and to such I shall confine myself.

And first as to the time in which these parched grounds should be laid down. Here we are to be governed by the difficulties we have to encounter; that is, the drought of the summer months, burning up a loose shallow soil: we should therefore come into action in full strength; our fiorin should be as long settled in the ground as possible; we should lay it down the last week in August, or the first in September; we shall thus give our grass time to establish itself, while the vegetative powers of nature are in full force, through September and October, and still strong in November.

A similar caution is by no means necessary in moist grounds; for April 24, 1811, I laid down fiorin on moist peat bog, which gave me a most magnificent crop on the 28th of October following; and I have always had fine crops when laid down after my potatoes were dug in November and December.

Manure (that is compost) forms the next object; in *moist*, or *loamy*, or *peaty* soils, or in the vicinity of *stiff clay*, we have little difficulty in making up compost to any extent, without calling for animal manure, so valuable to the agriculturist for his farinaceous and root crops.

Should your arid district be in the reach of such materials, and at reasonable distance, you will easily surmount its natural difficulties.

My early culture of flax was in *dry upland* ground, rather *shallow*, and much worn; yet in 1808, it produced in one part six, in another seven tons of dry hay to the English acre; in 1809, no falling off; in 1810, the deluges of rain made weighing impossible; and in 1811, the Committee sent from Scotland report most favourably on the luxuriance of its crops.

The composts with which every spring I covered this field lightly, were a mixture of *turf mould* and *ashes*. In 1811, much clay was thrown in; which proved unfortunate, as the extreme wet of the preceding winter had prevented the heap from being properly attenuated; and after being spread, the long and heavy rains made it like putty; of this the Scotch Gentlemen complain.

It is thus my composts for top dressings were formed; and although I have raised such enormous crops, I never used one load of animal manure.

I fear the case will be very different in the parched shallow grounds, which form the subject of your inquiry ; and that you will not only require *animal* manure to enliven your composts, but that you will be much embarrassed where to find any earthy materials to raise for compost.

In Norfolk, upon which I have had much conversation with my friend Mr. Curwen, their *open*, *sandy*, and formerly *barren* soil has, by ingenuity, mellowed into great agricultural skill, been made to produce most valuable crops ; but I could not hear of any thing adapted to compost, except the very soil itself ; nor any thing to quicken it with, save animal manure.

Though in Norfolk, and in *your* dry shallow soils, animal manure will be required for your composts ; be it remembered, that florin crops, whether consumed as dry hay, or winter green food, will produce to the acre a far greater quantity of animal manure than any other crop : it is not then unreasonable that a part of this manure should be expended in renovating and stimulating the soils that produce these same crops.

Whether, then, your composts be formed by mixing up the soil of the place with what dung you can afford ; or whether you have been more fortunate, and have found both a proper material, and ashes to stimulate it with ; I shall assume your composts to be formed, and ready for use.

The ground must now be tilled, and loosened at least seven inches deep ; taking care always to keep the richest part as well as possible to the surface.

I shall here probably be told, that fiorin roots, never striking an inch and half deep, do not require to have the ground loosened so far below them.

I once thought so myself, and was embarrassed at finding that fiorin always throve better as the soil was deeper. My friend Mr. Curwen pointed out the cause to me, which was afterwards most satisfactorily explained by our kind host, the learned Bishop of Llandaff, the discoverer. It was, that the perspiration of the earth was a great stimulator of vegetation : of course, that if the ground was bound up immediately below the roots of the plants, the ascent of that subtile matter was interrupted, and its efficacy abated or lost.

When the surface shall be sufficiently loosened and levelled, spread over it *one half* of the compost that can be afforded for the place; and then with a garden rake, a grass harrow, or even a spade, mix it with the very upper surface, so as to enrich the little shallow matrix, to be occupied by the roots of the grass.

Now scatter your fiorin strings (stolones) on the surface, and spread your remaining compost over them, so as nearly, but not entirely, to cover them ; and as the vegetative powers of nature remain long in force after September 1st, the stolones will strike

root from every joint, and soon compleatly establish themselves.

Should the proprietor of these arid grounds be able to procure, from any reasonable distance, *ashes*, or even a small quantity of compost *very* rich and friable ; he would do well (though it be not absolutely necessary) to throw a light sprinkling over his stringers late in March: he will thus stimulate his fiorin into early luxuriance, and will have made a rich skin on his surface for the stolones, so soon as they project, to strike their radicles into.

By early luxuriance, a fiorin fleece will have clothed the surface, before it be burned up ; will preserve any moisture that falls in rain or dew ; and will prevent the approaching drought from penetrating to the roots of the grafts.

In the description of land you inquire about, the *summer* vegetation of the fiorin will be more faint than in deeper or moister soils ; but I expect, when in autumn the moisture shall be more abundant, that vegetation will be *more* powerful, and will continue longer in the latter ; especially where the surface shall have been made very rich. And I repeat, that the natural disadvantage of these soils, and their inaptitude for fiorin culture, can alone be counteracted by rich manure, kept well to the surface.

While the difficulty and expense of raising fiorin crops on dry shallow soils are greater than on those

of more favourable description, the advantages and conveniences to be derived from them are less.

My Cumberland and Scotch friends exulted, when I assured them, I would supply them with an abundance of rich *green food* from the first of September until near May, relying on the store of ashes they commanded : But in the dry heaths and sandy soils you mention, the proprietor cannot with prudence use his scythe before the middle of November ; from that time I conceive he will be pretty much on a footing with the proprietors of deeper and moister soils.

Dry hay is necessary to every agriculturist ; and I have repeatedly boasted of the superior quality of fiorin hay, and the enormous crops this grass produces.

Giving me full credit for these positions, you wish to extend its culture ; and you naturally ask me, can such crops be also raised from the grounds which form the subject of your present inquiries ?

When I say *yes*, I must next proceed to the measures to be pursued. Here I shudder at answering you ; dreading an abatement of that confidence, which you have hitherto so boldly placed in me.

I have already limited the period for fiorin hay-making to the month of October ; but then I had supposed the soil to be favourable ; of course that the vegetation of the grass had been long in action, and that in October the crop had attained an high degree of luxuriance.

Will that be the case in the circumstances now under discussion? By no means. The drought of summer will have retarded the growth of our grass, until again stimulated by the autumnal moisture; and far from having attained its perfection in October, it will then be in its highest paroxysm of vegetation, and of course mowed at great loss.

Should our anxiety for increase induce us to defer mowing until some weeks later, our hay harvest is thrown into the shortest days; a season in which, although I have ascertained that fiorin hay can always to a certainty be saved, yet I discouraged the *practice*, and suspect I shall be excused from troubling you with my wise reasons.

If we abstain from mowing, our vegetation is still going on, our stolones continue to lengthen, and our crops to increase. Can we, then, venture them to stand until a longer day shall enable us to save and store them with ease and certainty?

This question is not brought forward in aid of the present discussion, nor is this late period of mowing suggested merely for the accommodation of the proprietors of dry sandy soils. The question is already before you; I have already intreated the Bath Society to inspect my process of spring hay-making early in March; I have already requested my friend Mr. Græme to conduct their Committee; and I have done this without the inducements I have just now stated for deferring the mowing of light, dry

grounds; the crops I have reserved for late operations, growing on *loamy, rich, and moist* grounds.

This measure must to you have appeared a bold one; it is not so now to me, who have practised it for years with success. The advantages of delaying to mow a vegetable in uninterrupted increase are obvious : you, and your Society, are called upon to discover the difficulties that occur in the practice, and if you cannot discover any such, to sanction the new measure, by your testimony in its favour.

Should your Society decline my proposal, already satisfied of the impossibility of my succeeding, remember they pronounce from *theory* on the success of a *practice* they never tried; while I, led by plausible *theory*, have repeatedly *made* the experiment, and invariably found *theory* and *practice* to be in perfect unison. Remember the materials I use (the *stolones* of grass) were never attempted to be converted into hay by any one before me; that I was the first who ever tried to make hay of an *animated* substance, impregnated through all its parts with *vegetable life*; while the hay hitherto made by others has been composed of *dead inanimate* materials, (the *culmi* of grass,) deprived of their life by the scythe, and of course proceeding to a state of putrefaction.

I am, Sir,

Your much obliged and very humble servant,

W. RICHARDSON, D. D.

ARTICLE II.

On the Measures adopted by Parliament for lessening the Expense of Inclosure Acts, &c. &c.

[By the President, BENJAMIN HOBHOUSE, Esq; M. P. in a Letter to the Secretary.]

SIR,

Whitton-Park, May 27, 1812.

IN the ninth Volume, page 55, of the Transactions of the Bath and West of England Society, over which, through the partiality of that respectable body, I have had the honour to preside for the last seven years, you will find a letter addressed by me, on the 17th of October 1798, to the Secretary of that day, on a subject which appeared to me of very considerable importance. As no reasonable expectation could then be entertained, that Parliament would put an end to private Acts for the Inclosure of Lands by giving to England a law in favour of General Inclosure ; I turned my thoughts towards the means of multiplying the number of private Acts, by abridging, as much as possible, the great expence with which they were attended.

In the Spring of the year 1800, the same subject, which had attracted my attention, engaged the consideration of the House of Commons ; and a Select Committee was appointed, to “ consider of the most

“ effectual means of facilitating, under the authority
 “ of Parliament, the inclosure of the waste, unin-
 “ closed, unproductive lands, commons, common
 “ arable fields, common meadows, and common of
 “ pasture.” As I was a member of that Committee,
 it will not create your surprize, sir, when I inform
 you, that their Report contained a suggestion to be
 found in my letter, to which I have before referred.
 I am happy, however, in an opportunity of declar-
 ing, that more of the merit of that Report, which
 contains so many useful regulations, is attributable
 to the judgment and activity of those members of
 our Society, at the same time Members of Parlia-
 ment, than to my humble, but zealous exertions in
 that great national cause.

In consequence of the recommendations of that
 Committee, several Resolutions for the purpose of
 diminishing the expence of private Acts of Inclosure,
 were moved in the House of Commons; which
 Resolutions, with a few verbal alterations made by
 the Lords, received, before the prorogation of the
 session in 1800, the sanction of both Houses of
 Parliament.

I cannot describe, sir, with what satisfaction I
 perceived that our Society had published a copy of
 those Resolutions;† and expressed a hope that “ the
 “ continuation of the endeavours which had pro-
 “ duced them, would shortly prove effectual to the

† See the tenth volume of the Bath Society's Papers, p. 328.

“ end of lessening the expences of private Acts.” Here the subject ends in our Volumes ; and it has occurred to me, sir, that our Transactions would be rendered more complete, by adding an account of the proceedings of Parliament founded upon those Resolutions, and also of the effects produced by such proceedings ; and by entering into an investigation of any subsequent measure of a similar nature, which may have been proposed to the consideration of the Legislature.

On the 18th of May 1801, a Bill was moved in the House of Commons, in order to carry the joint Resolutions of the two Houses into effect ; and it was afterwards passed into a law. The preamble of the Act (41 Geo. III. c. 109) best explains its *objects*. “ Whereas, in order to diminish the expence attending the passing of Acts of Inclosure, “ it is expedient that certain clauses, usually contained in such Acts, should be comprised in one “ law ;* and certain regulations adopted for facilitating the mode of proving the several facts

* To avoid repetition, as I shall have frequent occasion to refer to this Act, I shall henceforward call it “ the Consolidation Act,” and not, as it is usually denominated, the General Inclosure Act, lest it should be mistaken for an Act for the General Inclosure of Lands. When I speak in future of “ the Select Committee,” I mean the before-named Select Committee of the House of Commons, appointed in 1800 for facilitating Inclosures. When I speak in future of “ the Resolutions,” I always mean the before-mentioned joint Resolutions, passed in the year 1800 by the Houses of Parliament, for promoting the Inclosure and Improvement of Waste Lands.

“ usually required by Parliament on the passing such Acts, be it enacted, &c. &c.”

The first Resolution is merely declaratory of the advantage which would attend “ a diminution of the expence of inclosing and, improving, under the authority of Parliament, the waste, uninclosed, and unproductive lands, commons, common arable fields, and common meadows.”

With regard to the second Resolution, the 42d clause of the Consolidation Act should be consulted; which clause allows “ Justices to take affidavits or affirmation by Quakers, of the notices required having been given, of the consents of the parties interested therein, of the allegations contained in the preamble of such Bills, and of the quantity of land to be inclosed.” A clause more calculated to abridge the expence of a private Inclosure Bill could not have been devised. Where those who were interested in the inclosure of a parish lived at a great distance from it, a personal application to each of them by some individual, whose duty it was to prove, before the Committees of the Houses of Lords and Commons, their consent, dissent, or neutrality, was necessarily attended with a very burdensome expence.

Mr. Charles Ellis, a very able solicitor in London, being asked by the Select Committee, “ Have you found any difficulty in procuring consents, and proving the same before the two Houses?” answered, “ Yes, both in regard to proprietors living

“ at a distance, and residing abroad. In the former
 “ case I have found it necessary to go to Bath and
 “ Durham, to procure the consent of proprietors.
 “ The journey to Durham cost 31l. 6s. 6d. though
 “ I went by the mail. In regard to obtaining the
 “ consent of the proprietor abroad, I prepared a
 “ power of attorney to his steward in the country,
 “ who resided near the parish to be inclosed, to au-
 “ thorise him to sign his consent to the Bill. The
 “ execution of which letter of attorney was proved
 “ by an affidavit, sworn before the Consul at Oporto;
 “ and the consent thus given was admitted by both
 “ Houses of Parliament. The whole expence of ob-
 “ taining this consent amounted only to 1l. 13s. 8d.”

Mr. George White, an eminent parliamentary so-
 licitor, stated before the Select Committee an in-
 stance, in which the consent of a single proprietor
 cost 70l. or 80l. How much, therefore, is it to be
 wished, that the words of this (42d) clause of the
 Consolidation Act, instead of being “ it shall and
 “ *may* be lawful, &c. &c.” which words are discre-
 tionary, had been imperative upon the Houses of
 Parliament! The House of Commons made a stand-
 ing order for the purpose of giving effect to this
 clause from the second of July 1801, the day that
 the Consolidation Act received the Royal Assent;
 and adopted the practice of admitting as evidence,
 without further proof, the affidavits, or affirmation,
 of the parties interested, &c. &c. But the House

of Peers made no such standing order; and although, conformably to their Resolution, they received the affidavit, or affirmation, as prescribed in the clause, yet they always insisted upon the attendance, and required the evidence, of some person who had been witness to the proceeding. This being the case, the parties have not found it more troublesome and expensive to pursue their old method of proving contents before the Committees of both Houses by *parole* evidence; and therefore the practice was resumed. Hence the beneficial effects, which might have been justly expected from this 42d clause of the Consolidation Act, were entirely defeated.

Thus far as to one of the two *objects*, which the Consolidation Act professes to have in view, viz. "the admission of affidavits," agreeably to the second Resolution, "as to the facts usually required to be proved in Bills of Inclosure by parole evidence."

With respect to the other *object*, viz. "the consolidation into one law of the usual provisions contained in Inclosure Bills," the Act is made, in pursuance of the third Resolution, to comprehend all such clauses; and it declares in sec. 43, that "all and every the powers, authorities, directions, and provisions in this Act contained, shall be only so far operative and binding in each particular case, as they or any of them shall not be otherwise provided and enacted in any such to be passed as

“aforesaid.” By this clause all the general provisions comprised in this Act are rendered as binding by a mere clause of reference in private Acts, as if specially inserted in them; unless Parliament, under the power reserved to itself, should “otherwise order.”

For the clauses, which were common to all Acts of Inclosure, I refer to such Acts, and the Consolidation Act; and I proceed to shew the advantage derived from comprising them into one public Act, to which all private Acts might in future refer.

Mr. James Graham, then a London solicitor in full practice, (now Sir James Graham, bart.) being asked by the Select Committee, whether “it would not be a great saving in drawing up, copying, and subsequent proceedings in Bills of Inclosure, if many general clauses usually inserted in Inclosure Bills were enacted by a general law,” answered, ‘Yes, it would be a saving of nearly *one-half*, and sometimes more.’ Mr. John Morgan, a solicitor in Bedford-square, being asked by the Select Committee, whether “he had examined the Inclosure Bill (which he was then soliciting) for the parish of Hamworth, and the adjoining parishes, for the purpose of ascertaining how many clauses in it might be incorporated into one general law,” answered, ‘I have; the Bill, as printed, amounts to 67 pages, of which 48 pages might be included in a general law, which would save *two-thirds* of the expences of the Act, in so far as regards draw-

'ing it up, copying, printing, and the fees of engrossment.' Mr. George White, (whom I have before had occasion to mention,) the same Bill being shewn to him, is asked by the Committee, "how much the size of the Bill might be reduced by a general law;" and his answer is, 'perhaps *two-fifths* might be omitted; but of the clauses which might be thus omitted in particular Bills, I much doubt whether the particular cases might not make it necessary, or induce the party at least to think it expedient, to retain them. I think, *generally speaking*, *two-fifths* of the length of the Bill might be saved, if well and carefully provided for by a general law.' But it is needless to bring forward further evidence. It is obvious that the expence of drawing, copying, printing, and engrossing, must be greatly curtailed by thus consolidating into one general Act all such clauses as were formerly, (either because they were required by the orders of Parliament, or authorised by general practice,) common to all Bills of Inclosure. But I have been given to understand by those who are well informed, that although the advantages of such a procedure are so evident, many parties suffer themselves to be persuaded, on the ground that their cases are special, but where no special circumstances whatever exist, to insert the whole, or part of the common clauses into their private Acts, rather than make use of a general clause of reference. To such persons I

have only one remark to offer. If you have chosen to incur an unnecessary expence by pursuing a practice which can answer no other purpose than fill the pockets of your agents, complain not of a burden which you have voluntarily imposed upon yourselves.

With respect to the fourth Resolution, which declares it to be expedient that “ provision should “ be made in the general law for taxing the charges “ of the Solicitor and the clerks, and regulating “ the conduct of the Commissioners, and preventing “ unnecessary delay in carrying Bills of Inclosure “ into effect,” I have to observe, that in the general law, namely, the Consolidation Act, no enactment, conformable to this Resolution, is to be found; and that no other means have been employed to accomplish such excellent purposes. By the connection in which the word “ Solicitors” is used in this Resolution, and by the Report of the Select Committee on which it is founded, it is clear that Parliament meant the Country Solicitors, whose charges, as appeared to the said Committee, “ were various ; “ some of whom acted with great honour and moderation, while others aimed to obtain profit in every “ possible way.” Solicitors of probity, and I am happy to say that there are very many, would be glad to have their bills subjected to a general taxation; and it is much to be lamented that no such measure has been adopted. If the Houses of Par-

liament had proceeded to carry into effect this their own Resolution, the most important, perhaps, in point of retrenchment of all the Resolutions, there can be no doubt that the cost of an Inclosure Bill would have been very considerably diminished. The *long protracted* attendance of the Country Solicitor in town is perhaps the most heavy of all expences. Might not the time of his continuance there be shortened, either by expediting the stages of the Bill, or by other regulations?

As to the fifth and last Resolution, which provides (agreeably to the spirit of the suggestion previously thrown out in my before-mentioned letter of October 17, 1798) that Bills “for the sole purpose of” inclosing small tracts of land, not exceeding three “hundred acres, should be considered, as to the” payment of fees, only as single Bills; and that “those for the inclosure of tracts, not exceeding” one hundred acres, should be subject only to the “payment of half the Bill fees due on a single Bill;” there is no enactment respecting it in the Consolidation Act. But a standing order to that effect was made by the House of Commons, the operation of which commenced from the date of the Consolidation Act; and the House of Lords, although they made no such standing order, rendered their practice conformable to the Resolution.

What has been the consequence of the adoption of this proceeding by Parliament? An inclosure,

exceeding three hundred acres, received no benefit, for the alteration did not reach such cases; but where the land to be inclosed did not exceed three hundred acres, and also, where it was not more than one hundred acres, the fees were considerably reduced.

Let us first suppose the lands intended for inclosure to be above one hundred, and not to exceed three hundred acres. If, prior to the passing of this Resolution, the Bill would have been considered a Double Bill, and liable, as such, to the payment of fees, amounting together, in both Houses of Parliament, to about 154l. 3s. 6d., subsequently to that time it would pay no more, according to the table of fees, than about 70l. 6s. 2d.—Let us now suppose the lands proposed to be inclosed, not to exceed one hundred acres. If, previously to the adoption of this Resolution, the Bill would have been considered a single Bill, and liable to pay fees, amounting, as before, to about 70l. 6s. 2d., subsequently to that time it would pay, according to the table of fees, no more than 32l. 16s. 2d.—I have used this expression, “according to the table of fees,” because the fees of engrossment, which vary according to the size of the Bill, being exempted in *practice* from the reduction, the saving is in some degree lessened. But notwithstanding this circumstance, the abatement of fees is in the proportion of not much less than one-half; and, no doubt, it operates as an auxiliary to increase the number of small Inclosures.

Having examined the Resolutions, and the Consolidation Act, which originated in them, and was passed, as you have seen, in the year 1801, I must request you to carry your view forward to the year 1811, no enactment relative to the subject under consideration having taken place during that long interval. In the course of the last session, a Bill was moved in the House of Commons, entitled, “ a Bill
 “ to amend the General Inclosure Act, and to repeal
 “ so much of the statute of King Edward the First,
 “ called the Statute of Westminster the third, as
 “ prohibits the creation of new tenures in cases of
 “ exchanges of copyhold and freehold lands by
 “ Commissioners named in Acts of Inclosure.”

The object of this Bill was two-fold. Titles under exchanges of property, awarded by the Commissioners appointed to carry Inclosure Bills into effect, had been questioned. To quiet apprehensions under such circumstances, and to prevent future differences, was one of the objects proposed by this Bill ; and there is no doubt, that to remove difficulties with respect to exchanges of property directed by the Commissioners, would encourage inclosure, and produce great public benefit. The other object was to effect the use of affidavits in proving consents, &c. &c. before the Committees of the Houses of Parliament ; and for this purpose it was provided, that “ as this enactment in the
 “ Consolidation Act had failed to produce the bene-

“ficent effect intended to be produced by the same, affidavits of notices and consents might be made before a Master Extraordinary in Chancery, instead of two magistrates,” &c. &c. The Bill was dropped, owing, as it is said, to a doubt which the Law Officers of the Crown felt as to the propriety of giving to the Commissioners authority to create new tenures in cases of exchange, and partition. I rejoice that another Bill, under the title of a “Bill to explain and amend the General Inclosure Act,” but having the same objects, is now under the consideration of Parliament. I ought, however, to mention that it also contains an important additional clause, allowing Inclosures, not exceeding 500 acres, to be made under the authority of the Quarter-Sessions, without application to Parliament. I wait the result with anxiety. If the Bill should succeed, I will be an attentive observer of its consequences, and probably shall be induced again to trouble you.

You will perceive, sir, that as this Bill did not pass into a law, the facility which has been given to the passing of Inclosure Bills, whatever it may be, must be ascribed to the Resolutions, and the Consolidation Act. There can be no doubt, that by diminishing the size of the private Act, and reducing almost all the fees in both Houses of Parliament, a great retrenchment, although the amount cannot easily be specified, has been effected; and that without this retrenchment, numerous small parishes, the lands

of which are of inferior quality, would never have been inclosed : but still our annual production of corn is less, far less than our annual consumption. I do not now advert to the late harvest, which has proved so deficient, nor to the present high price of bread, which has brought so much distress upon the poorer classes, but to our usual supply in the *common course of the seasons*. - If it be true, as asserted by Mr. Rose, (and there can be no doubt of his accuracy,) that the population of Great-Britain has increased in the last ten years to the amount of one million and a half; and that although of late Inclosures have greatly multiplied, the multiplication has not kept pace with the increased consumption of the nation;* why should we content ourselves with such expedients, as the encouragement of the growth of Potatoes, and the improvement of our Fisheries? I agree with Mr. Rose, that from these resources a considerable supply of subsistence may be derived; but why not have recourse, in conjunction with these aids, to a far more powerful measure, to a General Inclosure Bill? Why not adopt the plan, either in letter, or spirit, recommended in the Report of the Committee of the House of Commons on Waste

* See the speech attributed to Mr. Rose in Stockdale's Parliamentary Register, No. 2, of this session, upon presenting to the House of Commons, on the 17th of January last, "a comparative Statement of the Population of Great-Britain in the year 1801," (when the annual census was first taken,) "and the year 1811, shewing the increase or diminution thereof."

Lands, &c. in the year 1797? The portion of land inclosed by mutual Agreement, without an express Act of Parliament, being necessarily very inconsiderable in consequence of numerous impediments, as for instance, where any of the persons interested were minors, &c. &c. the Committee advised the introduction of a law for removing any legal disabilities which might stand in the way of such an Agreement: but where all the parties were not in favour of a division, they suggested the appointment of Commissioners, with authority to make an allotment for those who should give their consent; rightly concluding that the dissentients, seeing the advantages possessed by the holders in *severalty*, would soon desire that their share also might be apportioned. This was the plan which the Committee of 1797 recommended to be adopted in England; and if Parliament had given its sanction either to this, or any other scheme which appeared to its wisdom better calculated to accomplish a General Inclosure, the many dreary tracts of vast extent, and the many millions of uncultivated acres which the eye now surveys with so much pain, would long ere this time have contributed to the national subsistence, strength, and prosperity.* But why should the advantages, both public and private, of such a measure, be confined

* It is supposed by the before-mentioned Committee on Waste Lands, &c. that England alone contained about 46,000,000 acres, and that about 7,800,000 of that number were Wastes and Commons, or an entirely uncultivated state. In the last fifteen years that wast

to England *only*? I am aware that a General Inclosure Act was passed in Scotland in the year 1695, and that under its provisions many Commons have been divided in a manner highly satisfactory to all parties. But this law is liable to two objections—

quantity has, no doubt, been considerably diminished, but in what degree it is impossible correctly to ascertain. The Committee, in calculating how long it would take to inclose, under the present system, the extent of land then remaining uninclosed in England, went upon the hypothesis that 50,000 acres, taking one year with another, would thenceforward be annually inclosed. Perhaps that estimate is too low. Let us suppose the number to be double, which is surely above an adequate allowance for the subsequent increase of Inclosures; and let us see how many acres would still continue uninclosed in England.

ACRES.	
7,800,000	Wastes and Commons, at the end of the year 1796.
Deduct 1,500,000	supposed to be inclosed in the last fifteen years, at the average rate of 100,000 acres annually.
6,300,000	Wastes and Commons in England, at the beginning of the year 1812.

I wish that I could have brought forward a statement less dependent on conjecture. I agree with the learned and patriotic Bishop of Llandaff, that “it is adviseable for Parliament to interfere, and pass an Act for the purpose of obtaining an accurate ascertainment of the number of acres, and the proportion of Commons, flinted Pastures, &c. &c. in each parish of the United Kingdoms.” [Vol. vi. *Communications to the Board of Agriculture*, published in 1808, p. 11.] If this were done, we should arrive at something like certainty as to the number of waste and uncultivated acres, not only in England, but the sister kingdoms. It cannot fail to be observed, that I have not taken into the account the Common Fields in England, both pasture and arable, &c. &c. which were supposed by the Committee to contain at that time about 1,200,000 acres. It is needless to point out how very much their produce would be increased, if they were inclosed, and holden in *severalty*.

the one, that under this statute no Common can be divided, in which either the Crown, or any Royal Borough, is interested: the other, that to ascertain the right of parties, and their mutual interests, before a Court of Law, has in *some* instances been attended with heavy expence, and great delay; and in *others* been found almost impracticable. With respect to Ireland, she must unavoidably stand in far greater need than England of an alteration in the present system of inclosing under the authority of special Acts of the Legislature; for since the removal of her Parliament, the expence of the country solicitor's attendance in London for the purpose of proving notices, consents, &c. &c. must fall upon her with increased weight, and occasion an Irish to cost much more than an English Bill of Inclosure. How much, therefore, is it to be desired, sir, that not only England, but Scotland, and Ireland also, should enjoy the beneficial effects of a general law, authorising the Inclosure of all Waste and Commonable Lands, and at the same time making special provisions for the protection of individual rights! It is stated by Count Hertzberg, minister of that great monarch Frederic the Second of Prussia, that his Royal Master annually expended, from the year 1763 to the end of 1783, at the rate of 2,000,000 of German crowns, or 300,000*l.* sterling per annum, in the internal improvement of his country, by draining lakes, embanking rivers, &c. &c.; and in particular, "by

“ the abolition of Commons, and the separation of
 “ arable land and pasturage, of which an individual
 “ proprietor could reap much greater advantage
 “ after a division, than when he holds such right in
 “ common with others.” This judicious and public-
 spirited system rendered Prussia, which is naturally
 barren and feeble, both wealthy and powerful. I
 ask not, however, for these nations, any public grant
 of money ; I ask only for a removal of those bars
 to improvement, which cut us off from the full
 possession of the advantages belonging to us in soil,
 climate, and agricultural knowledge.

Why do we neglect the blessings which the all-
 bountiful Author of Nature has put into our hands?
 We have mines of treasure, but we seem to know
 not the value of our domestic riches. We draw
 from foreign countries that precarious supply of
 corn, which, at a certainty, we could procure from
 home. Let us turn our eyes to China. The ave-
 rage population of that vast empire consists of three
 hundred inhabitants, or perhaps more, to a square
 mile, and yet they are maintained in plenty, without
 assistance from other countries ; while we, who have
 not many more than one hundred to a square mile,
 are dependant upon foreign supply for a great pro-
 portion of our subsistence. I cannot here forbear from
 quoting the forcible words of Sir George Staunton.
 In his account of Lord Macartney’s Embassy to
 China, he says, “ There no commons or lands are

“ suffered to lie waste through neglect, or through
 “ the caprice, or for the sport of great proprietors.
 “ No arable land lies fallow ; and whatever defect
 “ there may be in the soil, it is supplied by mixture
 “ of other earths, by manure, watering, and useful
 “ industry of every kind.” Would that these words
 were applicable to every part of these kingdoms !
 “ Would that every acre of waste and unproductive
 land was inclosed, and brought into cultivation !
 Would that all the obstacles, which stand in the way
 of an object so consummately to be wished, were
 removed ! When that time shall fully come, instead
 of importing corn, which annually costs the nation
 so many millions,* “ we shall have food within these
 “ our *fortunate islands* for the annual sustenance of
 “ *thirty* millions of people at the least ; and with a
 “ population of *thirty* millions, what power in
 “ Europe, what combination of powers, will dare to
 “ attempt our subjugation ?”† I trust you will feel
 assured, sir, that to no person could this event prove
 more delightful, than to him who is, with great esteem,
 and the strongest good wishes, sincerely your’s,

BENJAMIN HOBHOUSE.

* See Mr. Rose’s speech, as before.

† See in vol. vi. of *Communications to the Board of Agriculture*,
 the highly-interesting paper by the Bishop of Llandaff, to which I
 have before referred.

P. S. Since these sheets were printed, the Bill, which was brought forward this session for the purpose of “explaining and amending the General “Inclosure Act,” *i. e.* the Consolidation Act, has, like the Bill of last Session, been dropped in the House of Lords. When it was foreseen that it would not pass, another Bill was introduced to the notice of Parliament, which went further in two respects than that Bill; for it specifically provided that official copies of affidavits before a Master Extraordinary in Chancery, as to the facts usually required to be proved on the passing of Inclosure Acts, shall not only be admitted as evidence in all Courts, &c. but before Committees of both Houses of Parliament; and that the same benefits shall be extended “to Acts for draining or improving of land.” As this Bill did not interfere with the Statute of Westminster the third, or give new powers of any kind to the Commissioners named in Acts of Inclosure, it was hoped that it would prove unobjectionable to the House of Peers, but it was thrown out by that branch of the Legislature. I bewail the fate of both these Bills.

Sept. 10, 1812.

B. H.

ARTICLE III.

On the Prospect of an Inclosure Bill.

TO THE SECRETARY.

SIR,

PERMIT me to congratulate the Society on the auspicious prospect of an earnest Petition to Parliament, for the passing of a General Inclosure Bill, at a time when the distresses of a large proportion of the kingdom, on account of the dearness of provisions, must powerfully plead in its behalf.

Respecting a *General Inclosure*, for more speedily bringing into cultivation the waste and neglected lands of the United Kingdom, I have already said and written so much, that I am almost afraid of repeating my solicitude; for however sincere and laudable our views and endeavours may be, it is possible to *injure* a subject, in the opinion of some readers, by over-anxiety. But since the publication of our last Volume, which contained my thoughts much at large on the subject, as connected with *population*, the arguments then used have re-

ceived additional strength from the serious complexion of the times. The great distresses of the people employed in the various fluctuating manufactures, together with the scarcity or dearth of provisions, have evinced the necessity of a more extensive scale of *Agriculture*. My avowed object has been, and continues to be, that the strength, security, and happiness of the country may be firmly fixed on the sure basis of such provident and easy means.

To those sentiments, therefore, I hope I may not be taxed with vanity in wishing to refer. But, as connected with the subject, I am desirous of making my most cordial acknowledgements to those watchmen of general science, those guardians of our good fame, those able regulators of moral and literary taste,—the *Monthly Reviewers*. To that celebrated corps of censors, that band of patriots, I have been accustomed to look with a sort of peculiar veneration, from my youth up. They have doubtless changed hands, and suffered the successions of mortality and renovation, in common with other fraternities and learned bodies, during the *half century*, in which I have attentively read their labours. But as a body, they have maintained their dignified distinction, and, to use with great propriety a modern phrase, “ have deserved well of their country.” It was therefore with singular pleasure, that in their number for May last, in which they reviewed our 12th Volume, I found myself noticed by the flattering appellation of their

“ old friend ! ” This distinction more than counter-balanced any regret that I could feel, at being considered as rather a deluded enthusiast, on the subject of inclosures and augmented cultivation. I certainly did, and do now, wish to express myself warmly on those *means*, whereby, under Providence, my *old friends* themselves, in common with all good citizens, may continue to be comfortably clothed and fed : and I trust they are not become so “ rich and full,” as to be disdainful of my *friendly* concern for their well-being ! If not, they will kindly pardon my presumption, in here exchanging with them a few more of my sentiments on extended farming, as the means of feeding an increased population. My *old friends* are disposed to smile at my extravagant ardour for bringing into cultivation 10 millions, or even 5 millions, of additional acres ! They quote against me the complaint of my respectable neighbour and friend Mr. Tugwell, that when he was in business, he had often to regret the scarcity of farming labourers, and the difficulty of getting in crops on emergencies, arising from variations of weather, &c. This most certainly is now, and may ever be, felt as an inconvenience, if not one of the most perplexing difficulties, in agriculture ; and difficulties must ever attach to the best accomplishment of all matters of great and extensive importance. But is this a sound argument against the practicability of bringing an additional five millions of acres under the plough ? Such an augmentation

cannot be the work of a very short period : it must be the gradual business of a succession of years. But the system by which it may be accomplished being once begun with suitable ardour, the means of progress will be found, and will multiply in due proportion. A call equally urgent with that which brings into employ additional thousands and hundreds of thousands of young persons, in aid of trades and manufactures, would sufficiently excite and engage the youth of this country to agriculture. If it be asked, “ where are those youths to be found, who “ may answer such a call ? ” we would reply, on the principles of *Malthus*, they would be gradually, and not slowly, *born for the purpose* ! In other words, they would come into existence in proportion as the means of maintenance and accommodation, by profitable field labour, increased. In that proportion the natural propensity to marriage would induce our young husbandmen continually to marry. The natural effect would be, a legitimate healthy offspring; who, of both sexes, and from early childhood, would mostly be brought into the field for various uses, and would of course generally grow up in the useful habits of their parents. This result, indeed, pre-supposes a due provision of decent huts and cottages for their accommodation. Such a provision is what the advocates for field-improvements have ever warmly pleaded for, and it is an essential article in the great plan. But necessity, and indeed self-interest, must

induce land-owners, principal farmers, and even country builders, to concur in erecting such dwellings. The well-known general principle would not fail to operate, "*whatever is wanted, and can be paid for at a fair price, will soon be supplied:*" not to omit, likewise, that the *habit* of supply in any department is commonly seen to augment by example. Instances would sometimes occur of such young persons choosing to go off, from field labour, to trades and manufactures; but in general their choice would be otherwise; from the habits in which they are trained, that choice, we may fairly expect, would be chiefly governed by views of advantage. And as the population among manufacturing workmen in flourishing periods would also increase in proportion to the ease of maintaining a family by *those* kinds of labour, such hands will always be more or less regularly, but in general sufficiently, supplied in like manner. The field department may be reasonably expected to be duly filled from its aforesaid natural source. But when manufactures extensively fail, as has been often and will be often the case, the flourishing field may sometimes prove an happy retreat for the most industrious and orderly manufacturing poor. Not that they can be equally valuable at once in the field with those who have been regularly trained, but they must of course labour for a season for less money; yet their condition may be rendered comparatively comfortable during a pinching period; and by their additional

numbers, *extra* works of field improvement may be seasonably undertaken and accomplished. On the whole, we may fairly conclude that additional cultivation of land cannot be too extensively engaged in, for the security, prosperity, strength, and domestic comfort of our country! So much under the head of *labourers*.

But another objection of our learned *Reviewers* remains to be noticed,—that is, the impracticability of finding *manure* for such an additional quantity of land in tillage! This seems with them an insurmountable difficulty. Let me entreat their attention, in their classical closets, for a few moments longer, and I trust they may possibly see cause for *changing* their theoretic sentiments.

As we must not refrain from *beginning* to enclose and cultivate five millions of acres of neglected lands, till manure shall have been *prepared*, and in *store* for the whole quantity; our plan must be to *begin* our operations, with a view to a certain great end, and proceed *as we can*; and this is precisely what all other spirited cultivators have successfully done before us. Indeed those of the present day may soon be expected to surpass, not only their early predecessors, but all intervening generations; because they will have at hand the records, and transmitted knowledge, of all former ages. The *metropolis*, the chief residence of *Reviewers*, could afford, comparatively, but little assistance in *manure* for so extensive a concern. The

refuse of Covent-Garden, and all the other London markets, the sweepings of all the streets, the dung from all the stables, in London, Westminster and their vicinity, large as the aggregate mass must be, may continue to be wanted for local uses within a limited distance. The same may be said of the produce of all other large cities and towns. But manure, where wanted for distant newly-enclosed fields, must be *found* and *made*,—and farming science and ingenuity can sufficiently furnish them : The means are abundant, and the use of them understood. Our old father, *Jethro Tull*, has maintained, (though rather extravagantly,) that almost all the necessary nutriment of lands in tillage may be derived, by certain management of the natural soil, from *atmospheric influence* : and after great allowance for the enthusiasm of his ideas, though professedly formed in *practice*, it must be admitted that much aid is to be derived from a due application of his principles, especially in the *drill* husbandry, wherever that mode can be advantageously used. Numerous other sources are however to be found. The *paring and burning* system is applicable to many surfaces, soils, and situations ; and an excellent mode of *commencement* in culture it frequently is. It furnishes a powerful manure for first crops. A first crop, however used, in farming practice, mostly produces manure for a second ; and succeeding crops, judiciously taken, increase it. The doctrine of intermediate *green, hoing,*

and *ameliorating* crops, answering many purposes of manure, is now generally understood. The burning to ashes of numerous weeds and trumpery from the surface, the refuse earth from making and cleansing of ditches, added to stable dung, and lime where it abounds, for compost; the careful preservation of all other soil of the farm-yard, including the running of urine from stables, and from cattle in farm-yards, into proper receptacles; the dung and urine of sheep, and some other depastured cattle abroad: all these are constant and growing means of manure in good husbandry. They are the natural effects of judicious farming progress. But there is one very important doctrine, which, if not *universally* founded in fact, is not uncommonly so, viz. that a manure at least not improper for the surfaces of lands is generally furnished by nature in an under-stratum; and may not unfrequently be found, at no inconvenient depth, under the respective surfaces. Such are *limestone* for burning into a most powerful agent, and *marl*, a well-known worker of wonderful improvements: These two are often found, also, in detached beds or strata, of easy access, and almost inexhaustible dimensions.

On the whole, the idea of insuperable difficulty, *from want of sufficient manure*, is to be considered as unfounded in fact and experience; and, consequently, to be placed out of the question on this important subject.

Happy should I be to find that my *old friends*, whose character, and whose remarks in general, I so highly respect, are led, by these my statements, to dismiss their apprehensions respecting my *visionary* enthusiasm; that they may think my brain is not wholly *turned*, by this national topic; but that my head and heart are soberly working together for a good end! My worthy censors and myself are perhaps grown too *grey*, in our respective stations, to admit of our living to see the great improvements that may hereafter result from a *General Inclosure Bill*, and a consequent most extensive cultivation. But those improvements *will be made*: They *must take place*, if the greatest social and political good of our country be ever pursued in earnest. The unprofitable commons and wastes near London have too long been shamefully neglected. I hope and trust the time is approaching, when they will be made to wear a far different face. It would be auspicious; and in proportion to their publicity, must furnish an influential example. I most certainly should rejoice to see it, on general ground of advantage to my country. But there is one particular pleasure, which I might possibly derive from it, of no common description,—and that is, the opportunity it might afford me of inviting my *old friends*, the Monthly Reviewers, to relax a little from their learned studies, and meet me, with a few other *friends* of the Bath and West of England Society, on the reclaimed

and cultivated region of *Hounslow-Heath*, that former scene of plunderers, gibbets, and barbarism! There we would survey, with rural delight, a *new creation* of pleasant little Farms, Cottages, and happy Cottagers; a lively epitome of what this nation, —of what a renovated world might be! There, on a redeemed spot, we would congratulate each other, as in the day of prosperity, on the happy scenery around us; and then, adjourning to a neat new Inn, (no baseless fabric of a vision!) with all the sober dignity suitable to our characters, we would partake together of a *civic feast*!! For the honour of the Bath and West of England Society, our literary London associates should be handsomely *treated* on the occasion; not as at a sumptuous city banquet, with turtle and venison, and fish from Billingsgate; but (in a style becoming decent farmers and patriotic writers) with “sweet and savoury meat,” the produce of the surrounding fields, with a dish of barn-door fowls, and the best *ale* that could be procured! If the luxury of *wines* were set before us, they should be *generous* and of *good flavour*. But we should not need either a *Dignum* to sing, or a political *toast-master* to raise unseemly mirth and clamour: our object should *not* be a day of riot and intemperance; not,

“The inspiration of the sparkling bowl;”

But,

“The feast of reason, and the flow of soul.”

And thus we might set an example to the awakened land-owners, and best patriots of numerous *other* improved districts, of rational rejoicing in the domestic prosperity of our country.

WILLIAM MATTHEWS.

Hetling-House, Bath, Jan. 1, 1813.

ARTICLE IV.

Report of a Committee appointed to conduct the Trial of Ploughs, for the Premiums of the Society, at Deptford Farm, June 13, 1811.

IN executing the commission with which the Society entrusted us, we had the pleasure of witnessing more zeal, exertion, and freedom from prejudice, than has usually fallen to the share of Committees conducting Ploughing Matches. The late experiment at Deptford Farm was honoured with a numerous and highly respectable attendance. Besides which, the number of Ploughs sent in competition for the Premiums was more than in any other instance in the Society's annals. Eight ploughs entered the field, and these were not merely the *ploughs of the country*, but ploughs of different construction, which excited much interest among the spectators, and caused much calculation on the part of the judges. And, what is worthy of notice,

although the premium did not confine competitors to employ any particular quantity of force, there was but *one* Plough drawn with more than 2 horses or oxen, and that was with 4 horses of a diminutive class. The soil was stone-brash of a 3-years grass ley, marked out in half-acre portions as nearly similar as possible, for the choice of which the ploughmen drew lots. The depth of the furrow was $4\frac{1}{2}$ inches.

The following is a numerical list of the portions of land; the names of the implements used; the force respectively employed; and the time in which the work was performed by each :

No.	H. M.
1. Mr. Gourlay, a Scotch Plough, drawn by 2 horses, in	1 51
2. Mr. Patient, a Wiltshire Plough, 4 ponies with leader, in	1 39
3. Mr. Biggs, a Double-furrow Plough, 2 horses with leader, in	1 2½
4. Mr. Davis, a Hampshire Patent Plough, 2 horses, in	1 56
5. Mr. Gourlay, a Ransome's Patent Plough, 2 horses, in	2 7
6. Mr. Garrett, a Beverstone Plough, - - 1 horse, in	2 32
7. Mr. Gourlay, a Double-furrow Plough, - 2 horses, in	0 59
8. Mr. Bennett, a Scotch Plough, - - - 2 oxen, in	2 51

Mr. King, of Stourton, Mr. Dyer, of Kingston-Deverell, and Mr. Baker, of Warminster, having been previously chosen umpires, accurately surveyed the quality of the work, and at the usual time (after dinner) made the following adjudication.

“ DEPTFORD INN, WILTS.

“ *June 13, 1811.*

“ AT the request of a Committee of the Bath and West of England Agricultural Society, we the

undersigned have undertaken to become umpires to decide on the merits of certain ploughs, for the Premiums of the said Society, at Deptford Farm, this day ; and we are unanimously of opinion, after due consideration of all the objects embraced by the Society, and what appears to be of permanent utility, that the Double-furrow Plough, No. 3, with two horses, is entitled to the first premium ; and the Ransome's Patent Plough, No. 5, to the second.

“ JOHN KING.

“ WILLIAM DYER.

“ GEORGE BAKER.

“ N. B. The above decision was made on the principle of cheapest and best.”

Much expectation was formed that one of the premiums would have been adjudged to the *Beverstone* plough ; and it appears that *its* portion of land was ploughed in a short time by a small force ; the work also was well done. But as there was good reason for placing implicit confidence in the judgment and impartiality of the umpires, and their decision being formed on the principle of “ cheapest and best,” according to this day's experiment, the award was received with universal satisfaction by a numerous assembly of opulent and skilful farming gentlemen. We cordially acquiesce in the decision of the judges ; and beg leave to request, that it may

be recommended to the Annual Meeting, to award the first premium

	£.	s.	d.
To Henry Biggs, esq; - - -	6	6	0
To Edward Mould, his ploughman	1	1	0

And the second premium,

To Robert Gourlay, esq; - -	4	4	0
To William Seville, his ploughman	0	10	6

The issue of this day's experiment led us to remark, that the trial of Ploughs (originating with the Bath and West of England Society) has overcome, in a great degree, a long-lamented prejudice with respect to the construction of ploughs, and the force† necessary to be employed; and is gradually introducing a better system, of which the conduct and attention of the Wiltshire farming gentlemen, in this instance, has given an eminent proof. Another circumstance which attracted our observation was, that the ploughmen were chiefly *young* men, who severally set about their tasks with great ardour, considerable skill, and a determination to obtain the

† A Member of this Society, on the Saturday following the ploughing at Deptford, and who was present, accidentally overtook, on his way to Warminster market, a very respectable farmer; who, in conversing on the subject of the ploughing, observed, that his mind had been thoroughly satisfied of the prejudice against the general expence and unnecessary force made use of in ploughing; and had his father adopted what *he* now was convinced was right, namely, "working on his farm twelve horses instead of sixteen, *he* need not now have been the renting farmer."

premium; proving to the spectators, that, while the great and opulent are encouraging the science of agriculture by their patronage, and the *ingenious* are assisting it by their improved inventions, it will not fail through any deficiency of the *labouring* hand, under the encouraging influence of these enlightened times. The judges were so impressed with the meritorious conduct of *all* the ploughmen, that they set on foot a subscription, to be divided among those who had not obtained a premium. A sum was raised (which was distributed at the discretion of the judges) sufficient to give each a gratuity nearly equal to the amount of the lowest premium. From this circumstance, we take permission to suggest, that if the Society, at their Annual Meeting, should think proper to enlarge their premiums for this highly-important operation, both in number and value, particularly to *ploughmen*, it will be attended with very beneficial effects.

It was intended to have made an experiment with weighing the Ploughs, agreeably to a proposal made by Capt. Williamson, at the last General Meeting, which proposal was then adopted, and ordered to be printed. Mr. Garrett, of Lavington, with his Beverstone plough, sent also an *index* for weighing ploughs previous to trial, and likewise a man to explain the use of it; but owing to the novelty of the practice, for which the minds of all the competitors were not prepared, and as it was

not contained in the conditions of the premium, the adoption of either mode was, for the present, waved. We think the practice a desideratum. If the Society should be of the same opinion, perhaps, at the Annual Meeting they may make the use of some sort of dynamometer a specific condition to entitle a competitor to a premium.

We remain the Society's obedient servants,

ROBERT GOURLAY,
HENRY BIGGS,
JOHN BILLINGSLEY,
CHARLES GORDON GRAY,
HENRY WANSEY,
LEWEN TUGWELL,

We the undersigned take the liberty to add to this Report, that the two Gentlemen at the head of this Committee were particularly instrumental in effecting the splendour of this day's business. Mr. Gourlay was so obliging to accommodate the Society with the ground where the trial was made.

JOHN BILLINGSLEY,
CHARLES GORDON GRAY,
HENRY WANSEY,
LEWEN TUGWELL.

ARTICLE V.

EULOGY *on the late JOHN BILLINGSLEY, esq; delivered by the President, at the Annual Meeting 1811, while the Society was deliberating on the best Mode of perpetuating a good Likeness of their much-valued but deceased Vice-President.*

THE moment is arrived, Gentlemen, when we are called upon to exercise a sad and painful office:—we are seeking to obtain a good resemblance of our late much-lamented Vice-President, Mr. Billingsley; and we are now to determine whether a Bust or Portrait will best answer the melancholy, but, at the same time, in some degree consolatory purpose. At our last Anniversary, we had the pleasure, the delight, I may say, of seeing this most estimable and amiable man amongst us; but “the eye which hath seen him, shall see him no more.” Rare and extraordinary were his talents: nature had endowed him with a powerful and vigorous understanding, which it was his anxious and unremitting endeavour to enrich with knowledge. In the early part of life his attention was given to the Woollen Manufacture, but after a few years he determined to abandon that employment. Let me

not be understood, Gentlemen, to undervalue the pursuit of the Manufacturer, when I state it as a matter of joy that Mr. Billingsley's talents were finally diverted into another course. The occupation of a manufacturer is great, and important in society; but at the period when Mr. Billingsley quitted that destination, a field of greater usefulness was open to him; a department more congenial to his taste invited his entrance. It is notorious, that the Agriculture of this country, whether owing to our insular situation, or to the superior activity of our tradesmen and merchants over the tillers of the earth, or to any other cause or causes, had not advanced with the same rapidity as our manufactures and commerce. It might have been said of this kingdom, previously to the establishment of this Society, which was founded in 1777, that the Principles of Agriculture were but little understood; that the Implements of Husbandry were in a very rude condition; and that the Live Stock of the Farmer was far distant indeed from that perfection, which it has since attained. This was the degraded state of Agriculture, at the period when Mr. Billingsley, aided by a few other congenial and public-spirited individuals, applied his powerful understanding to its improvement; and the means which he adopted were well calculated for the attainment of that most desirable end.—Aware that the true system of philosophizing is founded on facts, he had recourse to Experiments; and he conducted

them with all that care and attention, without which they cannot be productive of the smallest degree of utility. With the result of one or two trials he was not contented ; he often, very often, repeated the same experiment ; and if the result were invariably the same, he then, and not before, ventured to draw his conclusion. His successful exertions we have all witnessed ; and we all know how liberal he was in communicating his knowledge, and in how able and forcible a manner he conveyed it. I am persuaded, Gentlemen, you will all agree with me, that the death of such a man is a great National Misfortune. The numerous Prize Compositions of Mr. Billingsley, which through the volumes of our Transactions have found their way to the public eye ; and his Agricultural Survey of the county of Somerset, approved and printed by the Board of Agriculture ; cannot but excite universal regret that this intellect has for ever ceased to shine, and that from this once abundant source of information no stream can longer flow. But still the portion of affliction which falls upon this Society, is the heaviest. We not only feel, in common with the nation and the world, for the loss of one who might have continued to spread knowledge for the benefit of mankind ; but having had the advantage of deriving wisdom from his lips, we have to lament, that cold is the tongue which gave life and animation to our discussions. Having a mind stored with knowledge, in the ap-

plication of which he was peculiarly prompt and happy, no question could be brought under consideration, upon which he had not power to enter. When points of intricacy have been started, has he not, by the strength of his reasoning powers, stripped them of all their difficulties? His investigating mind was never satisfied with taking one view only of a subject; he examined it on all sides with acuteness and penetration, and never ceased to sift it, until the course fit to be pursued was rendered plain and easy. In a word, the death of Mr. Billingsley has inflicted a severe and lasting wound in the bosom of this Society, whose interests were peculiarly dear to his heart, and to the advancement of whose prosperity the great bent of his genius was principally directed.

“Hitherto, Gentlemen, I have only adverted to the talents of Mr. Billingsley. To detail his virtues would be impossible; and indeed it is unnecessary, as they are so well known to you. His ruling passion was the love of mankind. He could not hear a distressing fact, without shedding tears; and the suffering which he bewailed, he always sought to relieve. This I, who, being distinguished by his friendship, have a still further cause for sorrow, who admired, revered, and loved him, can truly testify. In confirmation of my correctness, I appeal to the many around me, who had the honour of being intimately acquainted with him. His desire to promote the happiness of mankind was evinced

in the whole course of his life. To heal differences, and restore harmony, was the favourite pursuit of his mind. Judge, then, how his heart must have been rent by the disputes and litigation in which, towards the close of his life, he was unhappily involved. The immediate cause of his dissolution was, perhaps, that sensibility of mind which so strongly marked his character. I shall not enter into any of the particulars of those unfortunate differences, nor would it be fitting here to pronounce any opinion on the subject. Suffice it to say, that had it pleased the Great Disposer of all events to have spared his life for a few days only, he would have seen that innocence, of which he was proudly conscious, clearly established, and that integrity, which he valued more than life, firmly upheld by the unanimous award of the Arbitrators, to whom the final adjustment of the matters in litigation was committed. But such was not the will of Heaven ; and to the dispensations of Providence, however unsearchable by us, it is the duty of man to submit with implicit resignation, from a conviction, that under the superintendence and controul of unerring wisdom and perfect benevolence, “ whatever is, is right.”

“ During the short time which I have painfully employed in paying this last tribute due to the memory of my departed friend, our excellent Vice-President, I have perceived that your emotions were in unison with mine ; and that you felt it impossible to

suppress the throbs which agitated your bosoms. Such bursts of overwhelming sorrow are far more valuable testimonials of the merit of him, whom the Divine Being has thought fit to remove to another and to a better world, than "the pomp and circumstance" of funeral procession. His virtues are embalmed in your hearts; may the remembrance of them be manifest in your lives!"

A copy of the Annual Report of the Society, which contained the foregoing, having been transmitted to the Hon. Richard Peters, President of the Philadelphia Society, it produced those strong feelings of sympathetic regret, which the following letter, and minute of the Philadelphia Society, so expressively testify.

*Copy of a Letter from Richard Peters, esq;
to B. Hobhouse, esq.*

"SIR, Belmont, May 22, 1812.

"I Received, through the kindness of Mr. Barclay, the Proceedings of the Bath and West of England Society; and communicated to the Philadelphia Society your pathetic address on the death and character of the late Mr. Billingsley.

“ With a sincere concurrence in the sentiments and feelings of the Philadelphia Society, I obey their request in transmitting the enclosed testimony of their respect for the character, and regrets for the loss, of the late estimable Mr. Billingsley. The general sorrow which appears to have pervaded the members of your Society, is a more honourable Memorial of his worth, than are the applauses of the *million*, who are most commonly seduced by the glare of splendid achievements. Such evidences of merit, authenticated by the unsophisticated impulses of the *heart*, are far more solid and incontrovertible, than are the plaudits bestowed on *heroes* and *statesmen*, by those who are dazzled by the gaudy and deceptive lustre, with which ambition and policy well know how to gild what are called great actions. History employs her pen in recording the ravages of *conquerors*, who desolate the most fertile regions of the earth ; and in displaying the events, produced by wily politicians, which entangle nations in difficulties and embarrassments. Seldom, indeed, do we meet, in *her* pages, with any notices of the public and private virtues of private individuals, who, by cultivating and spreading the arts of peace, become more commendable and extensive benefactors to mankind, than are the most distinguished amongst those she emblazons ; and on whose praises she delights to dwell. It falls to the lot of few (and so far it is fortunate for the human race) to imitate

heroes and statesmen. But all may follow the examples, in a greater or less degree, of those who have contributed to the instruction of their fellow men, in the knowledge and practice of the means which ensure and diffuse happiness and comfort to the great family of mankind. It is reserved for individuals who *feel* their influences, and celebrate and hold up for imitation, and in so doing, to reward, the public and private virtues of private men, whose lives have been devoted to the performance of benevolent and good actions ; while the contemporary or succeeding eulogists of the few who acquire, by shining and arduous exploits, *imposing* renown, are engaged in recording or reviewing their *great*, but too often ruinous enterprizes.

You individually, and your highly-respectable Society generally, have reflected much honour on your own characters, while you were doing justice to the worth and eminent usefulness of your colleague and friend ! Mr. Billingsley's writings, and the accounts I have seen of his early and more recent exertions on agricultural and oeconomic subjects, have often instructed and gratified me. Let *me*, then, be permitted to add my humble praise ; and to join, most cordially, in the regrets his loss has excited. At the same time, suffer me to assure

you of the personal esteem, and respectful consideration with which

I am, very truly, your obedient Servant,

RICHARD PETERS,

In behalf of the Philadelphia Society, for
promoting Agriculture, &c. &c.

*B. Hobhouse, esq; President of the
Bath and West of England Society
for promoting Agriculture, &c.*

Copy of the minute of the Philadelphia Society
respecting the late Mr. Billingsley, referred to in
Mr. Peters's letter, transmitted to the Bath and
West of England Society, through its President,
Sir B. Hobhouse, bart.

" Agriculture Society, Philadelphia,

" May 12, 1812,

*" A printed paper from the Bath and West of
England Agricultural Society, containing an eulogium
on the late Mr. Billingsley, was read, having
been communicated by the President of the Philadelphia
Society of Agriculture.*

"The Society resolved to request the President to present to the President of the Bath Society their sincere and unfeigned sympathy, and to express the high sense they entertain of the distinguished virtues and patriotism of the deceased Mr. Billingsley, whose long and successful exertions have not only most essentially promoted the agricultural interests and prosperity of his own nation, but have been exemplary and instructive to the cultivators of the soil, in all countries in which they are known."

"Extract from the Minutes,

"JAMES MEASE, Secretary."

ARTICLE VI.

On folding Sheep in the Day-time; accompanying a claim for a Premium proposed by the Society for that Experiment.

IN A LETTER TO THE SECRETARY.

West-Lavington, Wilts,

SIR,

O^r. 30, 1812.

HAVING seen a premium proposed by the Bath and West of England Agricultural Society, for "folding sheep in the summer months," and

preserving their heads from injury by the fly, I beg leave to offer myself a candidate for the premium; and submit to your consideration the experiments and observations I have made on these subjects for two years past, in the hottest months of the year, namely, June, July, and August.

In the year 1811, I regularly folded day and night between fifty and sixty rams of the Merino breed, with some South-Down crosses: the sheep were folded on vetches. And in the year 1812, I adopted a similar mode of treatment, with this difference; I put together seventeen rams and thirty wethers in two folds, each fold containing sufficient food for the day, in the following manner,—I moved forward one fold every day, appointing the sheep to remain in the old fold by night, and chiefly in the new by day. My shepherd pitches only one fold in the course of the day, arranging the hurdles for the sheep to go to the new fold in the morning, when the dew is off, and to be shut up in the old fold in the evening, by which means they make as clean work as possible. The size of the fold must be altered in proportion to the quantity of food it contains, which can be easily determined by the vetches being either eaten or left on the ground. I found the sheep thus folded in higher condition than the other part of my flock; which difference I attribute to the former being at rest in the fold, and the other obliged to travel several miles each day for their

food, which was partly on Salisbury plain, partly on clover, in the former part of the day, and in the evening on vetches, previous to their going to the fold for the night.

The advantages derived, I conceive, were very considerable; the rams would otherwise have been in a much worse condition, and the ewes and lambs sustained injury by their interruption, particularly in their travelling from one pasture to another, and from them to their places of nocturnal repose.

Besides, by the folding system, the food of sheep is preserved much sweeter, and in a more wholesome state, than otherwise; is more agreeable to their taste, and congenial to their nature. It is a fact well known, that they have a strong aversion to good food, after it has been trodden by their feet, or soiled by their manure.

The thorn hedges also, when sheep are not folded, are liable to be injured by them, both when newly planted, and afterward when tender sprigs spring forth after the operation of cutting.

When in the fields, or on downs, the sheep are detached from each other, and prone to wander, frequently trespass, and generally leave their manure under hedges, or in other situations, where it is of the least utility: but by the folding system their manure is regularly deposited over that land the owner wishes, and where it is brought into immediate use for the succeeding crops.

My sheep were preserved from the injury of the fly, by the shepherds applying common tar to the parts where the insects had seized them.

By observation likewise, it appears to me, that sheep are less subject to injury from the fly, when *thickly* folded together, than otherwise: I suppose, from a greater mass of effluvia arising from them in their congregated state, than when in their state of dispersion; because, in the latter case, the effluvia must more readily mix with the atmospheric air, and the effluvia is an ingredient the fly dislikes; or, being in the fold, the sheep have the advantage of sheltering their heads under each other. It is, however, evident to me, that the fly seizes them with greater avidity when in their scattered state in the field, than when assembled in the fold.

The wool of sheep likewise is best preserved by the system of folding; dogs, flies, and maggots, often make them repair to the hedge for shelter and relief, seeking rest in danger and concealment among briars, but it is often to their injury. If the consequence be not broken bones, or mangled flesh, it will frequently be ragged garments, or coats studded with thorns, gravel, and dirt, unfriendly to their owners, the woolstaplers, the manufacturers, and of course to those who have to wear them after the sheep have done with them. Also, the wool wasted and lost in consequence of it is an object deserving attention

Thus, Sir, actuated by a desire to oblige the honourable members of your Society, and stimulated by an ardent zeal for the public benefit, I have now submitted to you the results of my experiments and observations relative to the objects specified in your advertisement ; and remain,

Most respectfully, your humble Servant,

C. GARRETT.

We whose names are hereunto subscribed, declare that the preceding statement is well known to us, and is strictly true.

THOMAS BOX, West-Lavington.
ROBERT HOOPER,
HARRY HOOPER,
THOMAS LYE.

Twenty-four bushels of chaff, at 20 to the cwt amount to about $21\frac{1}{2}$ tons yearly ; which, deducted from 48 tons, (the quantity we were consuming within the year,) gives a saving of about $26\frac{1}{2}$ tons or more than half.

I have, however, carried the retrenchment further by cutting in bean-stalks, to the extent of about a quarter of the chaff. These, being laid uppermost in the cutting trough, keep the hay well pressed, and cause it to be cut more regularly. Thus we now use about 25 cwt. of hay monthly, instead of four tons !

It is customary in our quarter to throw bean-stalk under cattle, a practice which cannot be too speedily abolished. Mine had suffered much from standing out full a month in the late rainy weather, yet all my cattle ate the chaff cut from them alone, without hesitation ; indeed, rather in preference.

I am, Sir, your obedient servant,

THOMAS WILLIAMSON

Writblington, Nov. 9th, 1812.

ARTICLE VIII.

*Communication on Ploughing, and the use of an
Index Engine.*

[By a Member of a New Ploughing Society in Wilts.]

TO THE SECRETARY.

West-Lavington, Nov. 14, 1812.

SIR,

THE object of your truly honourable Society I conceive to be in all respects rational, useful, and patriotic, and consequently deserving the attention of all lovers of mankind ; and with sincere gratitude and pleasure, I acknowledge my obligations for its existence, and indefatigable exertions in communicating general knowledge on subjects of Agriculture, Arts, Manufactures, and Commerce.

Thousands, no doubt, have experienced the benefits of your annual communications already ; and many more anticipate the time when your exertions in agricultural improvements will be attended with still greater success. All men are interested in discoveries really beneficial ; and the new modes of using the plough claim the attention of the Agriculturist,

to make his land produce crops good and abundant, and at a reduced expence. It was from your experiments in ploughing, that I was induced to send a Beverstone plough, invented by Mr. Tugwell, to your ploughing match at Deptford, and which, I am happy to find, gave general satisfaction.

From your Society, a noble ardour in agricultural pursuits has been kindled in this neighbourhood, and is still emanating with increasing usefulness. About two years ago, at my request, a few of my friends agreed to make a public trial of ploughs, and accordingly we put the same in practice ; which was the origin of the Market-Lavington Ploughing Match. We have since that time had four public trials, which were all very respectably attended, and satisfactory results were witnessed. The Association has, since its commencement, gradually increased, and *now* assumes the title of the *South-West Wiltshire Farming Society*. We have distributed our premiums to the most successful candidates, according to their respective deserts, and rewarded *all* the ploughmen somewhat in proportion to their merit, viz. three coats value 45s. 37s. and 30s. were given to the three most meritorious ploughmen. We are still going on with unanimity and zeal ; and have appointed our next meeting to be in the first week in June 1813, of which public notice will be given in the Newspapers.

I have procured an Index Engine, for the purpose of determining the resistance of each plough; and, in my private experiments, have nearly ascertained the number of horses which ought to be used in ploughing each kind of soil, in each season of the year. First, I determine the weight of the plough; if I find it $2\frac{1}{2}$ cwt. and the land to be ploughed to be of a medium description, that is, between a light and heavy soil, I judge two horses to be sufficient, supposing them to be good, and well kept. If the weight of the plough be $3\frac{1}{2}$ cwt. I allow three horses, if 5 cwt. four, and so in proportion. By my observations I have discovered sometimes too few, and sometimes too many horses used in ploughing; it may be *four*, when two would have been sufficient, and perhaps at a time when the labour of the horse was of the greatest value to the farmer, and his corn, turnips, &c. have been injured in consequence, by being sown too late; at other times two horses only may have been used, when *four* were necessary; in this last case, the motion of the plough has been impeded, the horses over-worked, and the usual quantity of land for the day has not been ploughed. I conceive that a good horse, in ploughing, ought not constantly to draw more than $1\frac{1}{2}$ cwt. because ploughing is attended with a dead weight or resistance, very different from that found in drawing a cart or waggon, and where, for lessening friction, every spoke of their wheels acts with the powerful

advantage of a lever, and alternations of more and less, are respectively experienced. A horse of inferior power, or of a medium kind, ought not, for the same reason, to draw more than 1 cwt. otherwise the cattle are injured, or a proper day's work is not done. In my experiments, likewise, I find, that an additional weight to the plough is similar to the additional weight in one scale, when, before, the beam was on an equipoise ; and a ploughman unnecessarily leaning on his plough makes it harder work for the horses, and they are much distressed in consequence of it. I calculate, by the Index Engine, that a person leaning on the plough, at the rate of $\frac{1}{2}$ cwt. is nearly equal in ploughing to half of the draft of a horse. In determining this, I have fastened weights on each handle of the plough, where the hands are usually placed, and according to the weights on the handles, so is the effect on the draft of the horses. This ought to be well understood, and duly guarded against by all agriculturists ; otherwise the loss sustained by an unskilful ploughman, in the management of his *one plough* only, I compute to be equal to half the expense of a horse ; and which, at the rate of 12s. per week, will amount to 31l. 4s. per annum, besides the injury done to the cattle. Mr. Tugwell, in his improved plough, has provided a remedy in this case, by fixing the hinder part of his plough higher than is usually done ; so that if the ploughman lean with an undue stress on

it, it immediately lifts the point, and makes it mount above the ground. This plough, when properly made, performs well. I use several of the Beverstone, and one Southampton plough invented by Mr. Tickell; they are all light and good. For several years I used the heavy ploughs, where lighter ones would have answered equally well, and at much less expence. The first light plough I used was the Beverstone; but I had immediately to encounter the prejudices of my servants, and some of my neighbours. I still however remained convinced of the correctness of its principle, and that the horses, in a heavy plough and on light soil, had an unnecessary weight to draw.

My convictions influenced me to expostulate somewhat in this way. Does the schoolmaster use a carving knife to make his pen, and prefer it to one that is smaller and more appropriate? In other cases, light work requires light instruments. Why then not adopt the same principle in aratrical process? Were I to compel a labourer to dig with a spade that had on it a few pounds of *unnecessary* weight, I should be charged with cruelty; but dumb animals are frequently treated with more cruelty than this, by unnecessary toil, and sometimes by the owners forgetting that it is the character of "a merciful man to be merciful to his beast."

The number of horses to be used in all ploughs must, of course, depend on the nature of the soil; but

impartial examination will soon discover the advantage of light ploughs in light soils, and which I compute to be full one-fourth ; or that 9 horses, in 3 *light* ploughs, in a *light* soil, are equal to 12 horses, in 3 *heavy* ploughs, in the *same* soil.

But it is necessary for a good farmer to be both a man of judgment and practice, and to be well acquainted with the construction of his implements, and manner of using them ; and ploughs require to be adjusted in all their different parts with the greatest regularity and precision. People in general are usually prepossessed in favour of the customs and manners of their forefathers, and averse to the adoption of any thing new ; and this, connected with the designs of ignorant and self-interested mechanics, (fearing their profits will be lessened,) and who may have intentionally altered and spoiled the original plans of the inventors, have doubtless, in frequent instances, been the means of the public being imposed on, and many useful ploughs having been rejected without a fair trial.

I remain, Sir,

Respectfully, your humble servant,

C. GARRETT.

ARTICLE IX.

On Cultivating the White Poppy.

[By Mr. Box, Surgeon, Lavington.]

IN A LETTER TO THE SECRETARY.

With a Specimen of the Oil.

SIR,

AT the last Annual Meeting of the Bath Agricultural Society, I was honoured with the premium for cultivating the white Poppy. When I gave the statement of my crop, I thought it perfectly consistent with article 21st in your Premium Book, as well as with article 28th in the 10th vol. of the Society's Papers; nor did I understand that the chief object of the Society, or that of Dr. Cogan in particular, was to ascertain the *quantity of oil* that could be obtained from a given quantity of land and seed under various circumstances, rather than, as stated in the Premium Book, "for *cultivating the white Poppy*," for which *only* I claimed the premium;

nor indeed did I understand it, until it was objected to the first premium being awarded me, because I did not also claim the second, and because I was in the *habit* of cultivating them too ; which I candidly told you last year, and judged myself from that circumstance none the less capable of giving you the information required, nor the less entitled to be honoured with the premium. I have now no other motive for sending you the specimen of poppy oil which accompanies this, than that of promoting the object of the Society, and to furnish it with that particular information, of which my statement last year was supposed by the minority to be then defective.

You was last year informed that the quantity of seed per acre, if a *good* crop, would amount to about four sacks, Winchester measure, each sack weighing nine score and 12 pounds. My crop this year does not exceed two sacks per acre; therefore I will make the calculation on what may be considered an average crop, say three sacks.

The seed I have now crushed and pressed, and have the pleasure of laying before you the results of my experiments, as accurately as in my power to give them : it is much more productive of oil than might *a priori* be expected, a quarter part of its weight being capable, by good management, of being converted into oil, without the use of hot plates for its expression. If testimonials are desired, I can produce them from the most respectable characters.

Three sacks of seed will be found, if good, to weigh 576 pounds, the produce of one acre, on an average; and this seed will yield 144 pints of oil, that is 18 gallons, admitting there is no waste ; but some waste must be allowed, therefore I will say 17 gallons.

	£.	s.
17 gallons of this oil are worth	-	17 0
The Oil Cake - - - -	-	3 10
		20 10
Expences - - - -	-	15 10
Profit - - - -	-	5 0

See Mr. Van Eys's statement by Dr. Cogan in the 10th vol. of the Society's Papers, Article 28th.

My expences in obtaining this oil are not a proper criterion, perhaps, for those who are in the habit of such a process, as I have had to purchase and erect a crushing mill and press; therefore have not been sufficiently accustomed to the nature of expressing oils to do it on the most economical plan, consequently that calculation would be better made by persons more acquainted with that peculiar branch. The mill was purchased for the express purpose of giving your honourable Society all the satisfaction in my power.

To have "scarified the green heads, and collected the exuding opium," of so large a quantity as stated in the Premium Book, (half an acre) would

have been a very troublesome and expensive process, and in a wet season, such as this has been, I may say impracticable, as the wet would wash away a great part of the exuding juice or milk before it could harden : however, from small experiments I discover but little or no difference in the produce of oil of the seed from heads that have been scarified and those that have not. Should the season be favourable for hardening the exuding juice, the opium is not worth the expence of collecting.

There are statements by Dr. Cogan, from Mr. Van Eys, in the 10th vol. of your Papers, very essentially different from the result of my experiments, and which in my opinion require some explanation. My crop last year was the best I ever saw, and produced but about 4 sacks of seed per acre. Mr. Van Eys' statement is, that two acres produced 25 sacks and 1 bushel of seed ! Here the weight should have been named, otherwise it may be leading people into erroneous notions. Their sack in Brabant must be much smaller than ours, or their acre enormously large.

But from the produce of oil, it is pretty evident the former must be the case, as his produce of oil is not proportionably greater per acre than mine. His acre produced four times the number of sacks, but only twice the quantity of oil ; his sack of seed produced not quite three gallons of oil, whereas mine produced six. The oil he calculates to be worth

from 14 to 16 pence per quart, or mingle ; it is in England worth 5s. This difference of price there and here in some measure equalizes the profits. His expences per acre in cropping, harvesting, beating out feed, pressing the oil, &c. are 9l. 7s. mine 15l. 10s.

Calculating I have 17 gallons of saleable oil, which is certainly the utmost quantity on the average an acre will produce in this country, at 1l. per gallon, I have 5l. profit ; Mr. Van Eys has 7l. 3s. 2d. his receipts being

	£	16	10	2
Expences		9	7	0

Profit		7	3	2
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In the whole it appears that the cultivation of the white poppy for the sake of its oil would not in this country be sufficiently profitable, taking the average of all seasons, unless the oils of almonds and olive, became more scarce than at present. The lowest degree of temperature to which I have had an opportunity of exposing this oil, 28° of Farenheit's Thermometer, did not in the least congeal it, consequently might it not be advantageously employed for the more delicate mechanical purposes ? The oil cake is very good, and may be used for all purposes that those from other seeds are. Fowls are extremely fond of it, alone, or mixed with boiled potatoes. Would not this, with the addition of a

little farina of any grain, be an excellent article for fattening fowls? The few trials I have given it strongly support the hypothesis.

I am, Sir, most respectfully yours,

WILLIAM BOX.

Lavington, Wilts, Dec. 1st, 1812.

Observations on the above, by Dr. COGAN.

TO THE SECRETARY.

SIR,

NOTWITHSTANDING the above account of the experiments made by Mr. Box does not fully answer the design for which the premium respecting the cultivation of the poppy was proposed, it throws considerable light upon the subject, and is calculated to incite to farther pursuits. The statement of Mr. B. manifests that the *quantity* of oil expressed from the seed of the white poppy is not less than *one quarter* of its weight; and the specimen of the oil exhibited to your Society manifests that from its *quality* it deserves every attention. In my narrative inserted in your 10th volume, I was merely an historian of facts and as the cultivation of the poppy commenced

some years after I had left Holland, I have not had an opportunity of judging of the *quality* of its oil. I believe that every Gentleman who has examined the specimen presented to you, will agree with me that it is pure and pleasant, hath the agreeable flavour of the nut, and is for the purposes of the table far superior to most of the olive oils upon sale. This circumstance is very encouraging to the cultivation of it, if the produce should be found to yield a reasonable profit. The above statement does not appear at first view to be encouraging; but a few observations will, I think, satisfactorily prove that it is not conclusive, and ought not to be final.

Mr. B. informs us that his first crop gave him about *four sacks* of seed per acre, and his second not more than *two sacks*; and this has induced him to state the average at *three sacks* per acre. But the trial of *two years* is not sufficient to establish this average. Contingent circumstances of a peculiar nature, have certainly presented themselves to make so extraordinary a difference as *one half* of the quantity. These circumstances are not specified. It does not appear whether the poppy was cultivated in the second year upon the same land as in the preceding; if it was, the experiment will only prove that it is not expedient to sow it upon the same land two years consecutively. If it was upon other land, the difference must be ascribed, either to the inferior quality of the land, or to some peculiarity in the

season, the extreme humidity of which may have materially injured the crop. The data therefore are much too imperfect to establish the maximum at *three* sacks. Should farther experiments prove that the crops approached to *four* sacks per acre, the profits would be greatly enhanced: suppose, for example, that the average crop should be stated at not more than *three sacks and a half*, each half sack having yielded, according to Mr. B.'s account, *twenty-four pints*, which is equal to *three gallons*, in value *one pound* per gallon, this circumstance alone would advance the profit to *eight pounds* per acre.

I must farther observe that the purchase of the press is made to be a deduction from the profits, but as this is an expence which will not recur, it ought not to be stated to the debtor account of the first produce; and not having been informed of the price of the instrument, we are not able to ascertain the deduction to be made on account of it.

Another important circumstance is, Mr. B. has not attempted to express by heat the oil remaining in the cakes, which would have yielded a considerable quantity, though of an inferior value. It is acknowledged that it would deduct from the value of the cakes, but by no means proportionately to the value of the oil thus extracted. These circumstances being clearly considered, render it no extravagant supposition, that the profits would amount to at least *ten pounds* per acre.

I am glad to find that Mr. B.'s observations accord with mine, respecting the *quality* of the seed not being injured by the scarification of the capsulum in a green state. If further observations should corroborate the fact, there cannot be any apparent objection to my proposal, to obtain opium from the same poppy which furnishes the oil. Could this be done in a satisfactory manner, the culture would yield a very extraordinary profit to the cultivator.

Respecting the disproportion between the quantity of seed, which Mr. V. Eys hath stated to be the produce of his land, and that produced upon the land of Mr. Box, I agree with him that there must be a mistake concerning the size of the sacks ; which it is not now in my power to rectify. The Dutch acre is nearly double in quantity to that of the English, as I have formerly stated ; but this will not solve the difficulty. The experiment itself, however, is not invalidated by this deficiency of information ; as the grand object is to ascertain the *quantity and quality* of the poppy oil to be produced by its cultivation in England, in answer to the enquiry whether it may not be equally deserving of cultivation with us, as it is in France, Brabant, Germany, and Holland.

T. COGAN.

Society's Rooms, Dec. 21, 1812.



ARTICLE X.

ESSAY
ON
THE IMPROVEMENT
OF
DARTMOOR FOREST;
AND

*On the means of so much INCREASING our GRAIN CROPS
as to make future Importation unnecessary;*

BOTH TO BE ATTAINED BY THE AID OF
FIORIN GRASS.

Addressed to Sir BENJAMIN HOBHOUSE, Bart. President of the
Bath and West of England Agricultural Society.

By WILLIAM RICHARDSON, D. D.

HONORARY MEMBER.

CONTENTS.

SUBJECT of this Essay.—The favourite objects of the Bath Society, and of their President; that of the *former*, the improvement of Dartmoor by Fiorin Grass; that of the *latter*, stoppage of the ruinous Importation of Foreign Corn.—Strong reason to hope that the improvement of *Dartmoor* will follow the introduction of Fiorin Grass.—*Certainty* that a general cultivation of Fiorin will supersede the necessity of importing *Corn*.—Two modes of augmenting domestic supply suggested by the President.—Fiorin particularly adapted to each.—Third mode, more important than either, to be derived from Fiorin alone.—Dartmoor composed mostly of *mountain*, and *moor*, and *morafs*, three descriptions of ground favourable to Fiorin; and long the object of the Author's attention, experiments, and *practice*.—First step to the improvement of Dartmoor, *scattering* meadows of Fiorin through it.—*Cultivation* a *necessary* consequence of meadows.—Should soil or climate be too harsh for corn, a profusion of hay *certain*.—Mode of ascertaining if Fiorin meadows can be formed on Dartmoor; and if so, whether they will scatter cultivation around them.—These points ascertained.—Mode of introducing population through Dartmoor.—Trifling expence incurred by these measures.—Short time required to ascertain and carry these points.

ARTICLE X.

On the Improvement of Dartmoor Forest; &c.

SIR,

I AM much honoured by the wish you express, on the part of the Bath Agricultural Society, that I should make farther communications to them; the very flattering manner in which those already sent have been received, makes your wish imperative.

I have scarcely an option left of the subject; for since I have had the high distinction conferred upon me, of being elected an Honorary Member of the Bath Society, the improvement of the dreary waste called Dartmoor Forest seems to have been the object uppermost in their thoughts.

In the proceedings of their Annual Meeting, held on the 17th of Dec. 1811, transmitted to me by their Secretary, I perceive they propose a large premium *for a practical Essay on the best means of improving the waste lands in the West of England, particularly in DEVON and CORNWALL.*

And at the next Annual Meeting Dec. 13th, 1812, the same large premium is continued for the cultivation of florin grass on the *marshy* and *boggy* parts of Dartmoor Forest, with a most flattering introduction of my name.

These public documents of the Bath Society prove their anxiety for advancing the improvement of *marshes*, *bogs*, and *morasses*, especially on Dartmoor mountain, and of acquiring information on their subject.

Now these same topics, *marshes*, *bogs*, *morasses*, and *mountains*, with their improvement, especially by *florin grass*, are the objects that for some years have occupied as much of my attention as could be spared from my more important duties.

The results of my numerous experiments, the success of my practice, with the conclusions I have drawn from my patient observations, were laid before the public so often as I conceived them worthy of attention, or that I considered my discoveries as likely to be useful to the agricultural world.

The Bath Society, in their proceedings of the two last years, seem to have concentrated these several objects, and to have brought them all to converge, as it were, into one focus,—Dartmoor.

The communication, then, that the President of the Bath Society has done me the honour to solicit indefinitely, shall be confined chiefly to this favourite

object of theirs,—the improvement of Dartmoor mountain by the means suggested *by themselves*. And I hope to be able to shew, that by the aid of the instrument they have chosen, *forin grafts*, that *population* itself, and every species of improvement and cultivation, compatible with the hungry soil and ungenial climate of that desolate tract, may be speedily introduced into Dartmoor.

The able speech delivered by the worthy President, at the late Annual Meeting of the Society, opened another topic of infinite national importance, *the ruinous exportation of bullion* (that has taken place for some years,) sent abroad to purchase *grain* for the maintenance of our population, 19 millions in two given years, and 42 millions in ten years.

At this important crisis, my *protégé* (*forin grafts*), now become a favourite with the Bath Society, *steps in*, and lends its powerful aid to the agriculturist, in every field to which he shall choose to extend his exertions.

The worthy President suggests two methods of *augmenting domestic supply*,—the CULTIVATION OF THE UNCULTURED LANDS, and an IMPROVED MODE OF CULTIVATING THOSE ALREADY UNDER CULTIVATION.

In respect of the former, what instrument so powerful as *forin grafts*? What stile of cultivation can advance so far into our most desperate wastes? What vegetable can give so rapid a return?

It will appear, as I proceed, that a spirited attack commenced *this Spring*, on almost any waste, may be rewarded by a valuable crop of *fiorin* this same season.

And as to the second, what can improve our cultivation so much as a profusion of animal manure, produced by the use of a luxuriant vegetable, rarely requiring dung to stimulate its own crops?

There is a third mode of augmenting our *domestic supply* of grain, untouched by the worthy Baronet, a field of extent far beyond what is requisite to supply the demands of our present, or of a greatly increased population; of a fertility far beyond that of the wild uncultivated lands, pointed out as the new scene for our exertions; I mean the ~~fix~~ million acres now applied to the sustenance of our domestic cattle through England and Wales, under the denomination of MEADOW.—Six million acres of our best *arable* grounds, consigned to the production of a commodity, to be procured with facility, of better quality, and in far greater quantity, from those unfit for the plough.

I have exerted myself for two or three years in proving, *practically*, that this new favourite of the Bath Society, *fiorin grass*, can be produced in the greatest abundance from every description of our wildest and most hopeless grounds. And when I just now shall proceed to discuss the capabilities of Dartmoor, it will appear, that should the dreary region reject the advance of the plough; we are not

left without a resource; for as a *pis alter*, we shall pour down from its bogs and marshes into the low country a copious supply of hay, enabling its inhabitants to apply their present meadows to the growth of the *cereal*, rejected by our own alpine domain.

I may be told, that in the greater part of England *wilds* and *wastes* do not occur, and therefore cannot be resorted to for fiorin hay; of course that our *arable* grounds must be employed in the shape of meadows (as at present), for the supply of hay, an article of indispensable necessity.

True, but no point was ever more effectually established, than that these same arable meadows, if laid down with fiorin grass, would produce crops of *better* quality, and of *treble* (at the very least) the amount, of what they give at present; of course for every acre so laid down, we give two to the plough, still preserving the same quantity of hay on the farm.

I shall now proceed to DARTMOOR, described to me to be a bleak mountain district, loaded with *marshes*, *morasses*, and *bogs*; and I am encouraged to go on, because the leading features of this dreary tract have been long quite familiar to me.

The improvement of mountain has for some time been a favourite object with me. I have not for years passed through an alpine district, without looking wishfully to its conversion into a more productive state. My speculations never carried

me so far, as to suggest the idea of encountering the Herculean task of reclaiming the immense surface ; but I thought I could see, that, by an easy supply of immediate wants, and by simple accommodations, the present produce of these wild pastures might be made far more profitable to their proprietors, and brought to afford facilities of bringing into cultivation such scattered portions of these uninhabited tracts, as nature seemed to have formed with a less rigorous hand than the rest.

A year ago I travelled through much of the *fells of Cumberland* with my kind and intelligent friend Mr. Curwen; and I believe I may say, he approves the ideas I suggested for their melioration, and published in the Transactions of the Workington Agricultural Society, in a memoir addressed to himself, the worthy president of that Society. I here shew how that article of prime necessity, Hay, might be obtained in the greatest abundance, without encroaching on the arable grounds of that beautiful district ; that their delicious vales, *now* covered with the finest meadows, by a sort of *coup de theatre*, might be clothed with a golden harvest ; and that meadows equally verdant and more productive than their present might be formed far up on their fells, upon grounds hitherto unapplied to any use.

When requested by the Farming Society of Ireland to visit the county of Wicklow, and to point

out how the new ideas I had suggested to them might be carried into effect in that favourite county; I shewed, in my report upon my mission, how the most productive meadows might be formed on the cheapest terms, in every part of its wildest districts; and how every single grazing farm in that whole mountainous tract might be supplied *within itself* with abundant hay for its own consumption, however great.

I taught the same lesson to my spirited and docile friend Mr. Young, of Harburn, on the western termination of the Pentland hills, and shewed him how a milder stile of mountain than Wicklow (still however uninhabited and uncultivated) might rapidly and cheaply be made applicable to any stile of culture the proprietor should choose to adopt. And I have now the satisfaction to know, that, before I had got out of Scotland, Mr. Young was deeply engaged in the work, and is still carrying on, with the greatest activity, the measures which I have pledged myself shall turn out to the most serious benefit to himself and his large family.

I have thus shewn that the improvement of *mountain* is not a new speculation with me; nor is the stile of improvement pointed out by the Bath Agricultural Society, at their late meeting, and just now announced to me by their Secretary, as the one they wish to see commenced with on *Dartmoor*, novel; for in fact it is the stile of improvement I recom-

mended for the fells of Cumberland, and which is actually carrying on, under my directions, in Wicklow and on the Pentlands.

In truth I possess but *one* secret on the subject; I have but *one* nostrum to administer, for the improvement of mountain tracts. *Dr. Sangrado*, in his extensive practice, had but one receipt for all cases, *bleeding and warm water*. I too, whatever mountain case may be put to me, use but one prescription, *scatter fiorin meadows through your mountains*, and the improvement of every acre capable of cultivation will *necessarily* follow.

That fiorin grass will produce magnificent crops of the very best hay far up on cold wet mountain, is now no longer a theoretical boast: the Marquis of Hertford, in the zeal for agricultural improvement, has established the point *practically*. At my request, my noble friend ordered a portion of seven acres to be enclosed, prepared, and laid down with fiorin grass under my directions, at an elevation of 900 feet: the result has fully answered our most sanguine expectations; the work began late in August, and the county of Antrim (except at Mr. M'Naghten's) never saw so superb a crop of hay as clothed this bleak meadow the ensuing season.

A friend, describing Dartmoor, tells me of islands of granite rising out of seas of bog and morass; a description formidable to others, but not to me. Bogs and morasses have for some years been the

particular objects of my attention, and I have more than once given the public my sentiments on their subject, and on the distinction (not sufficiently attended to) between *peaty* and *alluvial* morasses. Nor have my exertions towards reclaiming such barren tracts been confined to my pen. I have examined these dreary wastes, wherever I came in reach of them; have suggested to the proprietors the mode that occurred to me to be the best for reclaiming each of them under its local circumstances; and, wherever I was supported, actually engaged in the measure.

I convinced my friend the Earl of Rosse, of the facility of bringing into high profit such parts of the great bog of Allen as lay within or contiguous to his estate. We commenced the work with the fairest prospect of success, when a sweeping flood committed such depredation in his demesne, that every exertion was called for to repair the damage; the incipient meadows were deserted before they were inclosed, and a renewal of the work the ensuing season was prevented by his Lordship's absence.

I was more successful on the How of Camnethan in Lanerkshire, not less formidable than the detached morasses composing the bog of Allen. The proprietor, Sir James Stewart, admitted this bog (twenty feet deep) to be so formidable, that it would not be attempted unless I would undertake it. My friend promised implicit obedience to my

directions; and on my part I engaged that the whole expence of whatever was compleatly finished, should be covered by the value of the first crop. The conditions on the part of the proprietor, and, what was to me quite unusual, of his land steward, were rigidly fulfilled. I viewed the bog, and gave my directions in the middle of May; and before November was ended, 25 acres were in beard, 369l. expended, nor have I the least doubt but that sum will be far overpaid by the value of the next October crop. Thus one fifth is already finished, the area of the moor being 125 acres.

In the whole course of my tours through boggy and morassy countries, (of late very extensive,) I met with but one bog whose encounter I was afraid of; the How of Burnane in Wigtonshire; and I was told the worst description that could be given in Scotland of a desperate morass, was to say it was as bad as the How of Burnane. I discouraged the proprietor of the south-east side of it, Mr. Boyd, from attempting it; and when he persisted, in a public address to the Agricultural Society of the stewartry of Kirkcudbright, I told them that, although I hoped Mr. Boyd would succeed, I must intreat them not to consider the merits of florid grafts to be committed on so desperate an experiment. My letters from Wigtoun now inform me that their Agricultural Society has presented a gold medal to Mr. Boyd for having shewn to that country how

to raise magnificent crops of hay upon ground hitherto intirely useles. Mr. Boyd's meadow, as I hear, consisted of two acres and half, and was in the highest perfection, within less than one year from the time he first saw a siorin crop at Clonsfacle.

What comparative difficulties may arise in reclaiming these bogs, and those on Dartmoor which I never saw, I know not; but I confidently assert that every one of these *Irish* or *Scotch* bogs separately presents more formidable difficulties to the reclaimer, than any moor I met with in my extensive tour through Cumberland in company with my friend Mr. Curwen: and we never saw a moor, without discussing the facility of converting it into siorin meadow. *Moor*, *bog*, and *morass*, I consider as synonymous terms, at least where they are *wet* and *peaty*, the description now under consideration.

In discussing the subject of bogs and morasses, I must observe that I do not speculate upon reclaiming any one bog upon Dartmoor, or elsewhere, *in toto*. I have no other object, but to enable the contiguous, or (to speak with more precision) the continuous possessor of the soil, to form, on the periphery of the bog, as much siorin meadow as will supply the hay he can consume or dispose of; and for the practicability of this, on the easiest terms, I am responsible.

Sir James Stewart indeed, a Baronet of fortune and spirit, may encounter and subdue *the whole* of

his Cammethan How, in the centre of his estate; and by so doing he will prodigiously increase his own property, and eminently serve the country immediately about him ; for when I was in Lanerkshire, the current price of hay was above 12l. per ton ; and I saw my friend Mr. Baird, of Shott's iron works, pay 2s. 6d. for the Lanerk stone of hay, 22lbs. A great reduction, therefore, in the price of that necessary of rural life must be of the utmost importance to an agricultural county, whose soil (a stiff retentive clay) is unfavourable to the production of hay, and whose great manufacturing population would consider an abundance of milk as the highest luxury.

While such spirited proprietors as Sir James Stewart reclaim their *whole* moors, others of more limited powers, or whose moors are of greater extent, and divided property, will be content with partial encroachments on them, and will form meadows of the requisite size at intervals round their peripheries. I mention this to shew that the formation of florin meadows, on the *marshes* of Dartmoor, or on the *moors* of the North of England, does not interfere with any other plan of improvement, that may be suggested for them. The intervals between the florin meadows will leave an ample field open to agricultural exertions ; the competition between grain crops and florin meadows may be carried on quite round the periphery of the

moor ; and I may safely answer for it, that, as the marsh becomes desperate, the fiorin will keep the field longest.

A deputation from the Farming Society of Ireland, sent to inspect my fiorin meadows last month, have stated in their report that some meadows of mine, formed three or four years ago, on desperate bog, and now bearing crops of seven or eight tons of hay to the English acre, were so low, and so near to the stagnant water, as to be incapable of any other culture, or applicable to any use, but the production of fiorin.

I may be told I am forming speculations upon the morasses of Dartmoor, of which I can know nothing, never having seen them.

True : but these morasses must be either *peaty* or *alluvial*, and the world has before them the means of judging whether or not I am acquainted with these two descriptions of bog, and the modes of reclaiming each ; both requiring drainage, the former by a shallow scarification of the surface, the latter by a compleat discharge of its waters by *emissaria*, formed by man for the purpose.

Peaty morasses rarely require a renewal of the operations by which they were brought into a productive state ; while in *alluvial morasses*, the recurring stagnation of their waters must be always counteracted by the exertions of man, clearing their *emissaria*.

The revolutionary French, with their usual modesty, boast that the compleat drainage of the Pontine Marsh was an exploit reserved for their superior talents and better-directed exertions; that, among other benefits conferred upon mankind, they have restored salubrity to that part of Italy, and that the *malaria*, so much dreaded by both inhabitants and strangers at Rome, is no longer formidable.

They should say, *percant qui ante nos nostra invenerunt*; for it appears in an Essay of mine I have quoted, that the claim of having compleatly drained the Pontine Marsh has been put in stoutly at intervals, by different persons, for two thousand one hundred and twenty years. Very likely they may have been every one right; for however effectually the business may have been done, the same causes that originally formed this noisome fen, would again restore it to its useless and offensive state.

On Dartmoor we need not fear a return of its alluvial morasses to their present sterility; the high elevation of this dreary tract will make the discharge of its stagnant waters an easy task, and little trouble will be required in keeping the *emissaria* open, where the fall is so great.

I may be thought to dwell too much on the subject of *bog* and *morass*; but it is to the *marshes* and *boggy* part of Dartmoor, that the Bath Society, at their late meeting, seem to have particularly pointed

their attention ; I therefore thought I could not be too full on their subject.

What a field for improvement do we open here to the North of England, whose *moors* are all peaty, and whose peripheries (that is, so much of them as shall be found necessary) may be converted into most valuable fiorin meadows at an expence inconceivably trifling, rarely if ever exceeding the probable value of the first crop.

These peaty morasses are of *two* descriptions ; in *one*, the contiguous earthy soil graduates into the pure peat slowly through a considerable flat space, whose soil is a natural mixture of peat and earth ; a description admirably adapted to fiorin, as already sufficiently *consolidated* : this seemed to be the stile of most of the moors I saw in Cumberland.

In the *second* description, the transition from earth to pure peat is *per saltum* ; and the soil we have to form our meadow upon, being too light and spongy, must be made firmer.

This is the description of the Camnethan Bog ; and we shall find that half the expence incurred by Sir James Stewart in reclaiming it arose from the importation of consolidating materials from the exterior.

Another happy facility will attend the improvement of these isolated moors, scattered so profusely over the *North of England*, which is, that they will be encountered by a powerful agent I hope soon to call into action, *the mass of the people*, the only

instrument by whom improvement of vast extent can be carried on effectually and rapidly. Impress but a conviction of the advantage and facility of the measure, and the whole North of England is set in motion; every inhabitant encounters the periphery of the moor, continuous with his farm; innumerable meadows are formed in one season; and the maintenance of a flock of cattle, incalculably great, is transferred (with almost as much celerity as a scene is shifted) from our arable grounds to others now in a state compleatly unproductive; and these same arable grounds (now in the form of meadow) restored to their proper use, and made to produce *food for man*, at the moment of urgent necessity, so strongly put by the worthy President of the Bath Society.

I shall now take the liberty of making some observations on the mode of carrying on improvement, where the extent is enormous; and shall point out the persons in whose hands the work is likely to prosper, with the part which appears to me those interested should severally take.

There seem to be three: the *nation*, the *great proprietor*, and the *inhabitants* actually occupying or collecting to form its population.

The NATION ought not to undertake the detail of the work; for a source would thus be opened of *fraud, job, patronage*, and endless expenditure.

The GREAT PROPRIETOR is liable to the same impositions in a lesser degree; and in either hands, the work would proceed slowly, and advance only from particular points.

The third description (that is, the INHABITANTS) seem to me the only persons capable of executing the work, free from the preceding objections; and the best policy of the proprietor will probably be found to call this powerful agent, *the mass of the people*, into action, and commit the work to his hands.

This may seem inapplicable to Dartmoor in the present state of its population; but the most important improvement any desolate district can receive, is to stock it with inhabitants, provided they can be maintained by the *direct* produce of the ground, or *indirectly* by the vendible commodities they shall grow or manufacture; and this desirable object, *forming* a population, shall not be lost sight of in the following speculations.

BACON draws a comparison between the modes in which *nature* and *man* conduct their several operations, not inapplicable in the present case.

MAN, when he has any thing to form, carries on the work in parts and successively; they must be executed one after the other; and when the last part is finished, the work is compleat.

NATURE, on the contrary, carries on her work all at the same time; every part is advancing with

the same speed ; and each part, at any given time, is in the same stage of progression ; and all together arrive at perfection in the same moment. This is the case of a most extensive improvement. Can we persuade the mass of the people to undertake it, every part is set in motion *at once*, and the execution of the *whole* requires no more time than is necessary to finish the share of an individual.

The *nation* and the *proprietor* have still their parts to act ; without their interference, the machine will probably never be set in motion ; they are each deeply interested ; the *wealth* of the nation depends upon the *number* and *industry* of its people, and upon the produce of its lands. When inhabitants, therefore, are established in a desert country, and its wastes made to produce *something* where *nothing* grew before, the wealth of the nation is increased exactly in proportion to these additions.

The *nation*, therefore, is bound to co-operate, wherever opportunity occurs ; and as the work is to be carried on by the individual inhabitants, when local impediments arise, (I am not aware of any in the present case,) too great for the exertions of individuals, the nation should step in, and leaving them to act in their separate departments, should take upon itself to execute the common measure. The *nation* too should rouse exertion by rewards, and stimulate by the promise of premiums, to be paid *after* execution of given works.

The *proprietor* too must step forward and encourage ; he must enable, in most cases, the inhabitants to encounter their tasks ; he must (under great caution) furnish some of the means, without which they cannot proceed ; and above all he must make himself master of the subject, study localities, and point out how, under varying circumstances, industry is to be exerted to the greatest advantage. *Experiments* must be made under his direction ; he must thus find out the *practice* most likely to be successful ; and the more effectually to convince those who are to avail themselves of his pains, he must shew them *on the spot* the culture he recommends, and exhibit two or three specimens, on a small scale, of its success for their encouragement.

I shall now proceed to Dartmoor itself; and without as yet entering upon its localities, shall *assume* that dreary tract to resemble other mountain districts, though perhaps more harsh and ungenial both as to its soil and climate.

DARTMOOR then, like other alpine tracts, consists of hungry, shallow summits, affording scarcely any vegetation, and totally beyond the power of man, who cannot by any exertion throw them into a more productive state.

As we descend, the climate becomes somewhat milder, the skin of soil (though still light and shallow) receives some increase, and a sole of grass appears, affording a scanty sustenance in *summer* to

the small breed of cattle wandering about such dreary regions. This description too is utterly incapable of cultivation, and can never be broken up; but whether its spontaneous sole of grafs can be meliorated by light top-dressings is a question of much importance, (for the extent of this description is great,) and, so far as I know, has never yet been tried.

My friends Mr. Young and Mr. Critchley have both promised me, positively, to make the experiments I have suggested; the former, on the Pentland hills, and the latter on the dry and shallow sides of the Wicklow mountains.

Even should they succeed, this species of improvement probably would not suit Dartmoor at any time; but for the present, we must find *winter* food for our cattle, before we turn our attention to the improvement of the *summer* pasture.

As we descend farther, the soil frequently deepens, and in many places we find a stratum of earth sufficiently deep to bear cultivation. This is the field that lies open for the exertions of the agriculturist; as when we descend lower, and the soil becomes richer, and the climate milder, we pass into territories which I consider as already in his possession.

The description immediately preceding labours under two very great disadvantages,—want of *manure* and harshness of climate; by the former, the spirit of improver's proceedings are stopped, as his hungry soil requires the stimulus of manure to make it

productive; and by the latter, even if he can scrape up some manure, he is reduced to the choice of hardy vegetables, probably the *black oat*, and the *potatoe* alone. Hence improvement by agricultural exertions can never be a *primary* object in these forbidding regions; but, under circumstances, it *may* become a most important *secondary* one.

Let us, however, not give up the point with too much precipitation; the improvement of extensive districts by agricultural exertions is not to be abandoned upon speculations *a priori*. Let us fairly make the experiment.

When in Scotland, I observed the general usage of proprietors advancing upon wild untouched grounds, with a view to their improvement, was, first, to build a house, with all conveniences, for the future tenant; and then lay off a farm for him to commence upon, taking care to know that he had sufficient capital.

Let us now suppose the same measure to be adopted at Dartmoor; farm-houses built; and a portion of the mountain allotted to every tenant, containing each of the three descriptions mentioned above, *bleak summits*, *irreclaimable pasture*, and also ground capable of being brought into cultivation by labour and manure.

Where is the farmer to begin? He cannot advance one step without manure; his mountain cattle must be driven, as at present, from their bare and chilling

pastures, as winter approaches, and sold to those who have food to give them; the tenant not having enough to feed a milch-cow for the sustenance of his family. In this desperate case, let us recur to the remedy I have already prescribed. Let us suppose a florin meadow, of produce proportionate to the demands of his cattle, to be added to his farm, and the change is instantly felt; his mountain stock, when the season becomes harsh, are brought home to the shed prepared for them in the manner I have often pointed out; his milch cattle are fed with the richest hay; milk is produced in the greatest abundance; and at the end of the winter, his cattle, from their good keeping, become highly merchantable; he sells them off at good prices, and lays in a new store on cheap terms, to go through the same course.

The grand desideratum of mountain farms, animal manure, is now supplied in the greatest abundance; the tenant has a store ready for his spring operation; and will probably commence his attack upon his ungenial soil with a crop of potatoes, the precursor of grain crops; and his dung *ad libitum* will no doubt make his crop luxuriant.

The next season his dung is equally abundant, and will probably be applied in the same way; and new ground will be broken up for his potatoes, while that of last year is ready for any vegetable

that will bear the climate, and probably will be sown with *black oats*.

Thus every year the ground capable of cultivation will be advanced upon; and crops, affording food for man, will soon be scattered through all these dreary regions.

Whether an English peasantry could subsist on oatmeal and potatoes, with plenty of milk, I know not; but in the North of Ireland, a house so supplied would soon be filled with spinners, the produce of whose industry would procure a wheaten loaf, or any other luxury.

The English, too, would soon find that they could have their favourite food *bacon* in the greatest plenty; as each production of our new farm, *milk*, *oatmeal*, and *potatoes*, is highly favourable to the fattening of pigs. And good cheese could no doubt be made (through the winter at least), as the superior richness of fiorin milk is long established.

My friend, and fiorin amateur, Lieut.-Gen. Sir James Stewart, lately made the comparison with an accuracy I never reached. The worthy Baronet informs me, that he churned 12 quarts of milk from cows fed upon clover and rye-grass hay, with some steamed potatoes, and a small quantity of straw for a stimulus; the produce was 22 ounces of *butter*; while from an equal quantity of milk from cows fed upon fiorin, the produce was $31\frac{1}{2}$ ounces, and of very superior

The Dartmoor farmer, while he is thus annually increasing his cultivated field, will probably also turn his attention to his uncultivable pasture; and perhaps may be induced to make the same experiment for its melioration, I recommend to my friends on the *Wicklow* and *Pentland* mountains. Should he succeed, he, by improving the quality, and increasing the quantity of his summer feed, may be enabled to change the stile of cattle hitherto fed on *Dartmoor*, and to replace them by a better breed; a business now so well understood in England.

As the whole of the improvement of Dartmoor thus depends upon the produce of the fiorin meadow annexed to every farm, I shall no doubt be asked, Am I sure I shall find proper sites for fiorin meadows every where through Dartmoor?

I reply, that I *assume* (for I am not yet come to its localities) *Dartmoor* in some respects to resemble other mountain districts, and at least to possess similar inequalities of surface; of course to abound with vallies and streamlets, each of which can be so diverted as to irrigate lower grounds; and fiorin thrives better under irrigation than any other grass or vegetable I ever tried.

I have lately travelled through many mountain districts in Ireland and in Scotland, and never saw a single tract, of the size of a mountain grazing farm, upon which I could not have formed *more* fiorin meadows. In availing myself of local circumstances,

(such as peaty soil, commanding rills, &c.) than the proprietor could consume in hay or green foil.

I shall be told, Irrigation is a most expensive measure; that the preparation of ground, so as to make the distribution of the water uniform, requires much skill, and is very costly. I reply that nothing *can be cheaper or simpler* than the process adapted for the irrigation of fiorin meadows.

I shall mention one of these tours. A little above Drumlanrig, I passed from the Neith to Lead Hills, through high and bold mountains; this ridge, like all others, being sharper at one side than the other. Lead Hills, I was told, was elevated higher than any village in Britain: on enquiry, I heard that hay was a scarce and dear commodity with the inhabitants; upon which I shewed them luxuriant fiorin growing every where in great abundance, and assured them, that by cultivating this grass, of whose hardy nature they were witnesses, they might rapidly supply themselves with hay in the greatest plenty.

I passed on by the milder declivities of the ridge, through great tracts of moory mountain, by Crawford John to Douglas Mill; the greatest part of this course, very desolate, yet everywhere abounding with admirable sites for fiorin meadows, the produce of which, converted into dung, would enable nearly every acre (bating summits), I passed, to bear both farinacious and *root* crops.

I hope this paper may reach some of the proprietors of this extensive range, (whom I know not,) and that they will avail themselves of the hints I give; that they will remember fiorin meadows are formed at the most trifling expence; and exclusive of the *direct* and *immediate* benefit they afford, they *necessarily* soon will scatter improvement and cultivation all around them, by means of the dung produced by the cattle fed upon their enormous crops.

I shall now put a case, which I sincerely hope will not prove to be well founded; that the unkindly soil of Dartmoor cannot, not even by force of animal manure, be brought to bear farinacious crops, or to produce esculent roots. Perhaps so; but I shall not readily give up *fiorin*; to which strange grass many things fatal to other vegetables are quite innocent.

When passing through *Galloway* last April, my friends who had become acquainted with fiorin in Ireland, desired me to observe the heap of rubbish thrown out from the lead mine at Crestown, telling me I would find it covered with fiorin; and in fact I found my favourite in exclusive possession of the ungenial lump, no other vegetable being able to exist in such poisonous metallic soil: and I have stated in my tour through the Wicklow mountains, that we found a rich piece of fiorin in exclusive possession of the ground exposed to the deleterious arsenical fumes of Mr. Critchley's smelting-house,

affording a choice stock of fiorin roots and stolones, for the ground he was preparing to lay down with it.

I have often stated that *fresh* and *salt* water were equally congenial to fiorin grass; and that a rich bed of it below high-water mark at Portrush was a fertile nursery of stolones, either for cultivation or exhibition.

Let us then for one moment take for granted, that no other vegetable, applicable to the use of man, can be cultivated in the harsh climate and forbidding soil of Dartmoor, but that the hardy fiorin will thrive and luxuriate upon it. Even in this case the dreary desert may be made a source of great profit: fiorin meadows will afford abundant food in *winter* to all the cattle that graze upon it in *summer*; and the redundancy, which may be increased to any amount, will bear the expence of carriage to the low country, and make hay both plentiful and cheap in Devonshire.

The animal manure too, which cannot be applied to use on Dartmoor, under this supposition, will soon make its way down to the nearest cultivated farms, will improve their grain crops, and increase the agricultural field.

I shall be asked, why not apply their dung to enrich the fiorin meadows, which I have supposed to be so copiously scattered over Dartmoor. I reply, because that tract, otherwise so barren, affords within

itself ample manure for all the fiorin meadows that can be formed upon it.

Alluvial Morasses give the rich stuff raised from their drains, which, when left to dry, then turned and mixed up with some lime, becomes the best compost I know for fiorin meadow; and happily this rich material is already dispersed through the meadow itself, saving all expence of distant carriage.

Peaty Morasses afford ashes without bounds; these mixed with the soil of the place, and a very little lime, make as good a top-dressing as the former, and as conveniently placed.

Irrigated Meadows, I need scarcely say, never require dung; sufficiently enriched by running water.

The idea of supplying low countries with hay from the contiguous mountains did not originate with Dartmoor; for in my tour through Wicklow, I shewed the facility of supplying Dublin with hay from the southern range of the adjacent mountains; and of course by underselling them, to compel the farmers of the extensive area whence that market is now supplied, to turn their rich grounds to tillage, and to employ their dung no longer on meadows, but in forcing grain crops, and raising food for *man*, at a time when the insufficiency of the food for maintenance of the population of the united kingdom is but too well known.

Not is the speculation of supplying convenient markets with fiorin hay from the nearest mountains

confined to myself alone ; for in the very last letter I received from my friend Mr. Young, of Harbourn, giving me an account of his spirited proceedings on the Pentland Hills, he tells me, he looks forward to the supply of Edinburgh market with hay, calculates distances, and exults in the excellence of the great road to Edinburgh passing through his estate.

The object of the Bath Society in proposing a premium for the formation of a fiorin meadow on Dartmoor, is no doubt to discover how this newly noticed vegetable may be applied to the improvement of this wild tract. I say, that improvement can only be obtained by scattering fiorin meadows through all parts of this desolate region ; and that if this be done, that cultivation will follow, wherever the sterile soil and harsh climate will permit the industry of man to introduce cultivation.

Still, however, one important question remains. Will fiorin itself vegetate, and also *luxuriate*, under these same disadvantages ? Let us ascertain this point, before we encourage any one to embark too deeply ; let us feel our way by careful experiments, before we engage in expensive practice on a large scale.

My hopes, I confess, are sanguine ; both from the observations I have already made on Alpine summits, always finding fiorin upon them in health ; from the success of the experiment I made on the Marquis of Abercorn's mountain ; and still more from the great fiorin crop I raised on the Marquis of Hertford's

mountain, at the height of 900 feet, an elevation, which I expect we shall not be obliged to reach in any of our speculations on Dartmoor.

I am perhaps still more encouraged by my friend Mr. Dickinson, who transmitted to me a *fiorin stolo* he found growing near the prison on Dartmoor, a year and half ago ; before I had any reason to suppose that the Bath Society would ever speculate upon the cultivation of *fiorin* on Dartmoor.

May I not then assume, as I have more than once done before, that a vegetable, when fostered by man, encouraged by manure, and protected from its enemies, will thrive and luxuriate in the same soil and climate where it grows spontaneously without these aids.

The mode of ascertaining whether or not *fiorin* will actually luxuriate on Dartmoor, is very simple. I recommend four or five portions, of a *rood* or *half* an *acre* each, to be selected on the different *stiles* of soil where it is expected *fiorin* may be cultivated, and let these be effectually *inclosed*.

If an accurate statement be given to me of the nature of the soil, and local circumstances, of *each* portion, I will immediately give my opinion what *stile* of preparation shall be adopted ; and shall these little portions be ready in April, and any species of manure be got to enrich the ground for this first attempt, I shall transmit my directions for further proceedings, and also *stolones*, shall it be deemed

unsafe to depend upon the natural florin of the place. Should these little preparations be carried on with promptness and spirit; I have little doubt, that, wherever manure is applied, a crop may be mowed this same year, and satisfaction be obtained on the subject before *October* is ended.

I shall now assume the result to be favourable, that we have demonstration, florin will luxuriate in the harsh climate and ungenial soil of Dartmoor; of course that we may scatter through it the florin meadows, which appear to me to be the *only* instrument applicable to the further improvement of that desolate region.

Since then florin meadows are in this case of such great importance, I must obviate an objection, often made by the enemies to innovation, and sometimes pressed with much virulence, that the formation of such meadows is both *tedious* and *expensive*. Not tedious: for Sir James Stewart writes to me, that the meadow laid down at Caltreffs, in my presence, on the 8th of May, on ground by no means favourable, produced that same year 773 stone of dry hay to the acre; I presume the Scotch acre one fifth greater than the English.

And Mr. Baird, of Shotts, wrote to me, that the florin meadow I laid down for him May 13th, was cut in November. He says, "the mower has been much in the habit of cutting rye-grass, and says that the crop is equal in bulk to a crop of rye-

“grafs of 300 ftone per acre. This furely is very
“great, confidering I did not begin till the middle
“of May.” Mr. Baird does not feem to have been
aware that, in the making up, fiorin lofes much lefs
by evaporation than any other hay.

As to the expence of laying down fiorin meadows,
his muft obviously vary with local circumftances,
and I boldly fay is rarely *weighty*. We have fome
good materials on the fubject, which it will be proper
to bring forward, as, under prefent fuppoftion, the
improvement of Dartmoor can only be effected by
fcattring fiorin meadows through its whole area!

My venerable friend Mr. Miller, of Dalſwinton;
the moft zealous and moft extenſive cultivator of
fiorin that has yet appeared, little thought that
a paper he published with a view to encourage others
to follow his ſpirited example, would be quoted with
a view to difcourage them. Mr. Miller candidly
admits he found laying down his fiorin to be *expen-
five*. Why fo? The ground he alluded to was cut-
out mofs, full of deep bog-holes, which were to be
brought to a level furface; and filling up ſuch
excavations is well known to be very expenſive.
When the whole of my friend’s proceedings are
confidered, his example will not be found very
difcouraging. The thirty acres he alluded to were
worth nothing; were not valued upon him when he
purchafed Dalſwinton; and continued in an unpro-
ductive ftate, until he heard of fiorin grafs. Mr.

Miller ought to be good authority : *his third fiorin* crop was standing on the meadow, when he assured me under his hand, he would not let a 19 years lease of this thirty acres for less twenty pounds per acre English measure annually.

My good old friend may appear too sanguine in his expectation of rent ; but I know the Bishop of Derry sold his fiorin hay of 1811, in spring 1812, at a rate little short of 40l. per acre, supposing there had been no diminution in weight between *November*, when it was weighed and ricked, and *April* when it was sold as called for, and always preferred to the common hay. I never thought of calculating expence myself ; satisfied, I should be abundantly re-paid for whatever I laid out : once however by accident, I attained precision as to the cost of laying down *four* acres. In October 1810, convinced of the great superiority of fiorin in value, I ploughed up an old meadow which had supplied the house with hay for 50 years. In 1811 I took a crop of potatoes without manure, and in the last week of November laid it down with fiorin. I employed 40 men per day for one week, in which they brought the whole four acres to a level surface ; dug it lightly ; gathered fiorin stolones in the contiguous bogs, laid them down, and gave them a slight covering. I had a superb crop this autumn, 1812. One circumstance increased the expence, the meadow was prepared for irrigation, by inclosing every portion of it with

low mounds to retain the water, and to afford myself a dry walk every where through the meadow ; yet the whole four acres were finished in one week, by 40 men per day.

Of all the florin amateurs I have communicated with, Sir James Stewart alone kept an accurate account of the expence he incurred ; and in laying down 25 *Scotch*, (about 31 English) acres ; it amounted to 369l. 10s. 6d.

I must observe that Sir James's How of Camnethan was pure peat bog, 22 feet deep, 4 of them light and spongy, of course requiring to be consolidated by a firmer material, brought from the *exterior*, plain clay, well mellowed by turning, and made friable by the aid of lime. This measure (which, I trust, will never be required on Dartmoor) constituted much of the expence at Camnethan ; and, thanks to my friend's accuracy, we know the amount with precision. It is stated thus :—Preparing 43 yards of compost, 107l. 10s. Wheeling on compost 72l. 0s. 6d. ; these two articles making nearly half the expence.

Sir James's bog, like those on Dartmoor, had never been touched by man, nor applied to any profit ; in both cases, therefore, the money expended may be considered as laid out on the purchase of a fee-simple estate ; my friend's not improvidently, as I reckon, with reasonable top-dressings, six load or

1800 lb. dry hay to the English acre a most moderate average for future crops.

Mr. Baird laid down at little expence ; the plough was set going on his potatoe ground at one o'clock the day I arrived at Shotts. Next morning every thing was ready for me : an acre was finished that day by less than a dozen men.

Another difficulty is started. How are fiorin stolones to be found in sufficient quantity to lay down meadows ? Mr. Miller (the most extensive cultivator) never stated to me any difficulty in procuring stolones ; I had taught his land-steward, at *Clonfecla*, how to know and find them.

In Sir James Stewart's account, I find 11. 8s. per Scotch acre charged for collecting fiorin to lay down. Mr. Baird had learned his own lesson at Sir James's, and taught his people ; when I arrived at Shotts, he sent out the wives of his manufacturers, who had great bundles gathered for me when I came to the field in the morning.

Mr. Kennedy's (Lord Hertford's steward) mode of procuring stolones was amusing ; when his preparations were far advanced, and he was ready to lay down, he shewed the old women of the mountain what was fiorin grass, and desired them to gather as much as they could for him by an appointed day, and he would give them a reasonable price. When the day arrived, the women appeared with their bun-

dles, and Mr. Kennedy fixed the price, *one penny* for as much as he could span with the middle finger and thumb of both hands ; all parties were satisfied with the rate, and abundant stock was soon procured.

I am aware these minutiae must be tedious, but they contribute to throw light on a new and curious subject ; at least they give us reason to hope that there will be no difficulty in finding stolones in abundance on Dartmoor.

They serve us in another point of view ; and shew us the consummate inutility of the laboured discriminations of the *Linnaeans*, who, goading me to use *their* characteristic distinctions, tell me, there are forty varieties of the *Agrostis* tribe, with whose microscopic distinctions they are perfectly acquainted ; that is, they can tell, with much accuracy, how nature has enabled each variety to propagate its species.

— *Quibus verbis concumbant, &c.*

But they have not carried their researches so far as to discover that any single *Agrostis* out of the forty is applicable to the use of man.

Nobis in arcto et inglorius Labor.

Our attentions are limited to one single *agrostis*, out of the forty. In our discriminations we do not call for the powerful microscopes of the *Linnaeans* ; and when we send out our foraging parties, we never remind the old ladies to take their *spectacles* with them, yet we do not find them making many mistakes.

To return to Dartmoor. We are proceeding on the supposition, that it is established, by experiment, that florin will luxuriate on the *morasses*, and on many of the *irrigable* parts of Dartmoor: how then are we to advance into actual *practice*?

Here too we are to proceed gradually, and with caution. A very few small farm-houses are to be erected on scites containing the three descriptions of ground I *presume* to exist on Dartmoor,—*grazing wilds*, *grounds* supposed capable of cultivation by force of dung, and others adapted to *florin meadows*. We shall thus soon decide the important question, whether the introduction of agriculture and population be, or be not, *necessary* consequences of the dispersion of luxuriant florin meadows through a district uninhabited and uncultivated? a question by no means limited to *Dartmoor*.

Another description of grounds remains, to-wit, such as are capable of being converted into *florin meadows*, but admit no other improvement.

The produce of such meadows is applied to use in two ways, to be consumed on the spot,—either in giving winter food to the mountain graziers, or to fattening cattle sent up for the purpose.

It is too soon yet to press this topic further with a view to Dartmoor. In my Wicklow tour, and also in my letters to Mr. Young, I have gone minutely into the great facility of administering the produce of florin meadows on *the spot* to either out-lying

cattle with shelter accessible, or to fattening beasts, never quitting their stalls.

The second application of the produce of mountain fiorin meadows is to carry the hay down to the low country for use or sale. This idea is new to the world, but most plausible; the expence in forming such meadows will be moderate, and the crop immense. The adventurer in this novel speculation does not change his habitation nor his present pursuits, nor does he divide his establishment; parties sent up three or four times in spring will soon exterminate intruding weeds; and the extreme facility of saving fiorin hay; (especially in bleak situations) will make a few such excursions at intervals, on drying days, early in *October*, abundantly sufficient; no matter what rain falls in the intervals.

I have been so much ridiculed for my winter operations, that I must caution those who may be disposed to laugh at this *new* doctrine on the subject of hay-making, that they are not to assimilate the measures to be pursued, where the materials are of different nature, and governed by very different principles. The hay they have been used to is *dead* matter, hastening to putrefaction, and its progress accelerated by *wet*. *Fiorin hay* is *animated* in all its parts; carrying its protection against putrefaction (the principle of vegetable life) within itself, and by this powerful aid resisting it equally *wet* and *dry*, except when strongly compressed.

Neither I myself, nor any pupil I have communicated with, have as yet lost one handful of hay by the wetness of the late seasons in which we made it up; nor have I recommended such very late mowing as I have been ridiculed for. It is true, when I first discovered the powers of fiorin to resist weather while making into hay, I was anxious to establish this curious property; and for three years I gave public notice that I should mow fiorin grass, *for hay*, on the first and fifteenth of each of the four winter months. I did so regularly; and on the first of *March* had always in distinct cocks the hay cut and made up in the eight preceding fortnights, all in high preservation. I made these experiments to shew *powers*, not to set an *example* I wished to see followed, nor did I pursue it myself in actual *practice*.

The extraordinary force of vegetation possessed by fiorin stolones at late periods, when its energy seems exhausted in other grasses, makes it desirable to abstain from interrupting their rapid growth as long as possible. Still there are bounds which prudence will tell us we ought not to pass; and though it be *practicable* to save the produce of this *agrostis* in the very shortest winter days, it is not *desirable* to press the measure so far.

The strongest instance I have met with of the hardness of fiorin hay, occurred this winter; part of my garden passing into orchard by the growth of my trees, I laid down a plot of some perches

with florin, to try how it would bear shade. For three years I mowed, and saved good crops ; this fourth year my florin was also luxuriant, mowed October 25th, and immediately put into lap-cock ; when it was forgotten, my gardener not considering it in his department. On the 5th of January I found it drenched in wet, not having been touched since October 25th ; it was carried from the close shaded place where it grew, opened to the air for some hours, and again put in lap-cock. On the 8th of January, these were examined by Lord Viscount Northland, who authorises me to say, they were compleatly sound and uninjured.

I shall now look back to the measures I have recommended, not for reclaiming, but for improving *Dartmoor* ; that we may see if there be any thing discouraging to be met with among them, formidable from its magnitude, or inadmissible on account of the expence it must lead to.

The first step is simple,—to feel our way by experiments on a small scale ; here we press upon the *attention* of proprietors, and of those who have the management of the business, but not upon their *purse* ; no trap laid for expence, to be followed by speculation. Should the measures fail, little loss is incurred ; should they succeed, we have purchased a cheap lesson, and have received encouragement to carry *theory* into *practice*.

The next step is weightier, but not alarming : we build a few houses by contract ; lay off convenient farms for each ; and encourage the occupiers to try the measures that have succeeded with ourselves, and to enter upon the speculations we have opened for them.

The proprietors now pause ; and instead of acting for themselves as hitherto, hold out encouragement to others, to embark in the new field we have opened for them. That encouragement may be of two kinds ; —good tenure on reasonable terms ; and relief from rent, while the tenant is expending such part of *his own* capital, as may be required for his establishment. In this case it may be prudent for the proprietor to advance part, when certain the tenant will mix his own capital in the adventure, and thus improve the landlord's security.

Here ingenuity is to be strained in devising modes of encouraging settlers to establish themselves on this new field ; improvement by means of population being more desirable than any other.

The extent of Dartmoor, and magnitude of the wild district to be encountered, at first view seem formidable and discouraging ; but upon attentive consideration, it will appear, that an increase of *area* would neither call for greater expenditure, or for more strenuous exertions. Whatever be the size of Dartmoor, the measures to be pursued will not be

influenced by it ; be the district great or small, we have, it appears, but three steps to take.

The *first*, to ascertain if fiorin will grow, and luxuriate, in the appropriate parts of the territory in question.

The *second*, will fiorin meadows scatter cultivation and improvement all around them ?

The *third*, (the two former being established,) can we induce others to repeat experiments, the result of which have in our hands proved favourable? Can we tempt them to embark in an adventure, plausible in *theory*, and whose success we ourselves have ascertained upon trial?

These three questions form an epitome of the preceding Essay ; the last alone can have any relation to magnitude, and even that in a very small degree ; for the encouragement to be given on a great and on a small scale cannot be very different.

I am, sir,

Your most obedient, humble servant,

W. RICHARDSON, D. D.

Moy, Ireland, Jan. 22, 1813.

POSTSCRIPT.

SINCE the above was written, I have received an account of DARTMOOR from a gentleman of science and ability, who very lately made a tour through that bleak district. I am happy to find, on perusal of this ingenious paper, that it does not lead me to alter any thing I have said, but gives me the greatest encouragement to hope, that well-directed exertions for the improvement of *Dartmoor* by *fiorin* will be attended with much success. The terms hitherto used in describing Dartmoor to me, both by the Bath Society and private friends, have been *marsh*, *bog*, and *morass*; but this gentleman adopts the term *moor*, a description particularly favourable to *fiorin* cultivation. He says, "all attempts to cultivate the greater part of the moor have failed;"—"that the temperature of Dartmoor is lower than what would arise from elevation; at the prison, in consequence of the excessive cold, the guard is relieved every hour;" but it was near the prison, Mr. DICKINSON found the spontaneous *fiorin* he transmitted to me. "An atmosphere of considerable humidity is continually hovering over its surface, this stratum of vapour prevents the accession of air to the growing vegetable, and hence its destruction arises."

This conclusion the gentleman supports with much philosophical ingenuity, and shews that the deleterious effects of the enveloping vapour cannot extend to aquatic plants; "as the beautiful experiments of Mrs. Ibbetson have demonstrated, that these are provided with air vessels, which do not exist in any other species of vegetable."

The application of experiments, connected with natural history, to a botanical subject, surprises me as much as the meeting with an old friend in a dreary desert. I am happy to find the science of the vegetable kingdom is not left entirely in the hands of Linnæan dictionary-makers.

The physiology of botany is a beautiful branch of science, and Mrs. Ibbetson (with whose works I am not acquainted) will have much merit, if she revive this delightful study, and relieve us from the laborious pursuit of microscopic sexual distinctions, leading to a forced and useless *classification*, and terminating in a *nomenclature* too voluminous for the limited powers of man. For myself I am happy to find, from a scientific source, new encouragement to the cultivation of florin on Dartmoor. To avail myself of this, I have only to establish this newly-noticed vegetable to be *an aquatic*; and for that purpose I need only to refer to a fact I have often stated,—that in October 1810, I flooded several florin roots 20 inches deep, the water was not lowered one moment, &c. they continued to send up their stolones to the

surface for above four years ; and probably would have gone on, had not the constant winter deluges of 1810 produced such a quantity of deposit, as completely overwhelmed them.

I have repeatedly established by the most respectable testimony, that the humid vapours which so frequently *cloud-cap* the summits of Knocklaid, and Bessy Bell, in my own country, (each of them much higher than Dartmoor,) did not prevent the spontaneous growth of florin quite up to the spherical top of the one, and the conical apex of the other. It remained for Mrs. Ibbertson to develop the cause, and she has succeeded ; shewing *a priori* that we *ought* to have expected such a result, and that *theory* and *practice* mutually confirm each other. Shall we then shrink from the humid atmosphere and chilling vapours of Dartmoor, when we know that the plant which the Bath Society wishes to have tried upon its bleak surface, is, and ought to be, unaffected by these vapours ; and at the same time so insensible of cold, as to continue its vegetation, and to lengthen its stolones, under the *snow*, and in the severest frost of February ; and when every curious property, both of the plant itself and of its produce, while converting into hay, can be accounted for on sound philosophical principles.

W. R.

ARTICLE XI,

Report of the Committee appointed to inspect the Crops of Turnips, under Article 7 of Class III, for which three claims were tendered to the Society for Premium.

THE CLAIMANTS WERE,

1. Mr. Kemp, of Bathford, for a crop of Swedish Turnips, on an extent of not less than five acres, in the broad-cast manner.
 2. Mr. Estcourt, of Shipton-Moyne, Gloucestershire.
 3. Mr. Benett, of Pit House, near Shaftesbury, Dorset.
-

ON the 16th of February, the Committee proceeded to view Mr. Kemp's crop at Bathford. Their enquiries respecting the treatment of the soil for several years past obtained them the following information, viz. one field estimated and rented at 5 acres, but which proved to measure rather under that amount. In the year 1808 bore clover, of which

one crop was mown, and the second was seeded. Wheat was sown on one earth for the crop of 1809, which yielded at the rate of 9 sacks per acre; and so soon as that was removed, the land was sown with winter tares, not manured, nor dressed in any manner; this was the produce of 1810. During the *autumn* of the year 1810, the land was ploughed three times, and planted with wheat by means of hand-hoes; the produce was seven sacks per acre. It was then winter fallowed; and early in June 1812, was sown with Swedish turnips, for which preparation was made by three ploughings; after the second ploughing, about 15 or 20 tons (the claimant, not having made minutes, can only speak from recollection) of compost, formed of stable dung from Bath, barton dung, and road sand, in the proportion of about a third of each, were laid per acre; it was then ploughed very shallow, and sown; the crop was once hand-hoed at an expence of 10s. per acre. From the appearance of the land, and from the very great equality in respect to size throughout, the Committee have reason to judge, that the hoeing must have been excellently performed. The crop growing on exactly a quarter of acre was weighed, and amounted to 8 tons, 12 cwt. equal to 34 tons, 8 cwt. per acre. The soil of this field is calcareous free-stone brash; the aspect nearly south, and gently declining in that direction; the sub-soil, clay on a stone-brash; the land very high.

The Committee further inspected another field, of 3 acres, situate near the London road, much lower, but with the same aspect, and rather steep. The Swedes in this field were singularly regular in their distances, and in their individual bulk. Though the former crop had been wheat, and no manure used, the turnips were conspicuously superior to those in the other field, and might be fairly estimated at 40 tons per acre. Had circumstances permitted, (for it was five o'clock before the weight of the turnips drawn could be ascertained,) the Committee would, in justice to Mr. Kemp, who in every instance met them with perfect candour, and afforded every information in his power, have weighed a portion of this field, which had been sown, hoed, and treated in all respects, except in not being manured, the same as the other.

The Committee observed, that in the 3-acre field, the turnips all grew with very large necks, perhaps a foot high, and from 4 to 8 inches in circumference, promising a prodigious quantity of excellent sprouts. Though the 5-acre field was from the same seed, the plants on it had little or no necks. They also observed, that the turnips grew generally on the surface; seeming to hold only by their top roots. This manner of growth appears advantageous, inasmuch as, in all probability, the plants derive more of their nutriment from the atmosphere, than when buried in the soil; and as it renders them more

accessible to sheep. Mr. Kemp attributes this to *shallow* ploughing ; but Mr. Benett's crop for which *deep* ploughing had been used, presented the same appearance. The Committee hope the causes and consequences of these variations will become subjects for investigation among practical farmers. As on very light friable soils, turnips of every kind are generally much bedded, with little of their bulbs exposed to the atmosphere ; the Committee offer as a conjecture, that the high growth observed in the two crops under survey, proceeded chiefly from the disposition of most calcareous soils to bind ; whereby the plants are thrown upwards, and forced to expand their bulbs on the surface.

REPORT on a crop of Swedish turnips, for which a premium was claimed for John Benett, esq; of Pit-House, near Shaftesbury, under the 6th Article of 3d Class, which requires that the crop should be raised according to the Northumberland practice, and weigh at least 28 tons per acre.

It is necessary to premise, that, owing to some error, Mr. Benett's claim was given in under the 7th Article of the same class, which does not appear restrictive in any shape, beyond the condition that the crop should consist of the best orange Swedes. The circumstances under which this error arose,

seemed to warrant the Committee's proceeding to the investigation under the 6th, in lieu of the 7th Article, according to Mr. Benett's original intention and present desire.

The crop in question was grown on a soil very common on the Wiltshire Downs, namely, a flinty brash on a chalky sub-soil. The plants were in rows of 27 inches distance, and were generally of a fair size ; but in the opinion of the Committee, would have been greatly improved, had the women who hand-hoed them been provided with broader hoes. With respect to the regularity of the drills, and the plants in them, as also the very admirable culture of the field, manifested by the perfectly clean state of the land, the Committee cannot make too favourable a report ; especially as the land had within six years borne three crops of spring wheat, alternately with crops of Swedes ; thus furnishing a substantial proof of the high importance of the alternate course of green and corn crops ; and supplying about seven sacks of wheat per acre every other year, while the intermediate seasons produced immense quantities of most nutritious sustenance for every species of live stock. The pleasing condition of the land (on the 26th of February) was doubtless owing to repeated operations of the horse hoe, and to the judicious application of about 15 tons per acre of manure, principally from the barton, to each of the turnip crops.

Mr. Benett appears to cultivate the turnip of both species, on an extensive scale ; perhaps to the amount of 150 acres. The field examined by the Committee (on the 26th February) measured 18 acres, of which about 7 were fed off; the residue would have been removed from the land, but for the claim that had been preferred.

The stipulated area, namely, one rood, amounted to 6 tons 12 cwt. equal to 26 tons 8 cwt. per acre, of course not furnishing the weight of crop required by the conditions of the premium, the deficiency being 1 ton 12 cwt.; scales and weights were used in the field.

It is with extreme chagrin the Committee report this deficiency, amounting to little more than a 20th part of the required weight.

It is proper to submit to the consideration of the Society, the reason given by Mr. Benett for not having thinned out the plants more in the rows, namely, his having experienced much disadvantage, in his high and unsheltered lands, from setting out the plants to a greater distance ; whereby the turnips were doubtless individually heavier, in his opinion, but less capable of resisting the severe weather, to which his crops were exposed. Mr. Benett believes the smaller turnips to be the most hardy, a conjecture worthy of notice, especially among farmers occupying exposed lands. The Committee feel themselves bound, both by justice to the claimant, and by duty to the Society, to observe that the

Articles No. 6, 7, of the 3d Class, have in their opinion, been drawn up without suitable attention to the nature of the two kinds of turnips generally cultivated; both of which may, by Article the 6th, be brought into competition.

It cannot fail to strike the attentive agriculturist, that if, as is evidently the case, a crop of green tops, &c. weighing 28 tons, might obtain the premium under No. 6, while only 20 tons are required under No. 7, *wherein Swedes alone* are admitted, some distinction, or proportionate scale, was necessary for the regulation of claims under Article 6th.

Your Committee, therefore, submit to the consideration of the Society, the expediency of new modelling the two premiums in question, at the proper season; and they beg leave at the same time to suggest, that an honorary reward be conferred on Mr. Bennett for the excellent management, and most laudable example, he has shewn in the midst of a district where every exertion ought to be made for the improvement of a soil, at present much undervalued; and for the support of live stock, especially sheep, without the necessity of resorting to extensive wastes, or to practices both irrational and expensive.

Your Committee feel themselves the more warranted in tendering this suggestion, from observing the uncommon liberality and the systematic arrangement which distinguish Mr. Bennett, in regard

both to his farm servants, and to his neighbours. To the former, every encouragement is held forth, by emulative trials of skill, wherein the most expert are suitably rewarded. As an instance of this, the Committee acknowledge the high gratification they felt in being present at a ploughing match among Mr. Benett's tenants, when seven ploughs, of which six were drawn each by a pair of oxen, and one by a pair of horses, all with reins, were seen in competition for their employer's bounty. The general correctness of the work, and the quantity done in a given time, authorize the Committee to recommend Mr. Benett's system to farmers in general, and especially to gentlemen of landed property. In the latter capacity, Mr. Benett's conduct appears pre-eminently conspicuous; inasmuch as he has persevered in his plan with great judgment, and with no less determination to overcome whatever obstacles, ignorance and prejudice might oppose to his progress. Eager to furnish to his neighbours the means of facilitating their several operations, and of enabling them to rival him in the excellent courses he adopted, Mr. Benett has established, under his immediate auspices, a manufactory for implements and vehicles on those constructions he considers to be most applicable to the district.

The Society will, it is hoped, pardon the prolixity of this report; and perceive, that it has arisen purely from the solicitude felt by the Committee

to uphold this claimant, not only in this meeting, but to the community at large, as a gentleman who directs those superior intellects, and that affluence wherewith he is providentially blessed, to those wise and great purposes for which they were bestowed.

The Committee submit to the Society, under which of the Articles, No. 6 or No. 7, Mr. Bennett's claim should stand. If under No. 6, it will have been understood, that his crop not being equal to the required tonnage, they could not award him any premium: on the other hand, if under No. 7, it will be seen from their report upon Mr. Kemp's crop, that its superiority must entitle that gentleman to the premium. They therefore respectfully submit that, in their opinion, Mr. Kemp is fully entitled to the premium of Ten Guineas offered under the 7th article of the third class, "for the best crop of yellow or orange Swedish turnips, exceeding 20 tons per acre, from a breadth of land not less than 5 acres."

In the exercise of so gratifying a duty as the adjudication of this premium to the meritorious claimant, the Committee deem it incumbent on them to express, in the strongest terms, the pleasure excited by an inspection of Mr. Kemp's farm at Bathford; and they anticipate the promptness with which the Society will concur with them in opinion, as to the validity of that gentleman's title to the premium, when it is stated, that the Committee consider the

management of the lands, especially the pastures, and the stock maintained thereon, to be uncommonly good ; and such as ought to prove an example to his less enlightened neighbours.

Mr. Estcourt having taken the precaution of weighing a portion of the crop on which he had founded his claim, discovered that it fell short of the stipulated tonnage, and consequently withdrew his claim in time to obviate the necessity for the Committee's proceeding to its inspection.

HENRY WANSEY.
THOMAS WILLIAMSON.
W. FALKNER.

Hetling-House, April 13, 1813.

ARTICLE XII.

Report of the Committee on the Ploughing Match, for the Year 1813.

THE commission assigned to us of superintending the Ploughing Match for the premiums of the Society this year, was executed as hereafter stated.

Being confined to the vicinity of Bristol, it was difficult, from the short notice the Society were able to give, to meet with land answering exactly to the description proposed as a condition of the premium; and it was only through the exertions of one of your Committee that a plot of ground could be obtained for the experiment. At length Mr. Luton, in the parish of Westbury-upon-Trym, obligingly offered a field. In consequence of advertisement, a pretty large concourse of people were assembled on 18th of June, and five ploughs were in preparation to contend for the premiums offered. About half of the field (a strong loamy soil, upon stone brash) was divided into half-acre portions, for which the five ploughmen drew lots, and took their choice as under, viz.

To.	Ploughmen.	H.	M.
1. Mr. Fison, - - a one-wheeled plough,	James Tanner	1	45
2. G. W. Hall, esq; - ditto - - - -	James Lovell	2	14½
3. Mr. Luton, a new wrought-iron plough,	Henry Hart	2	27
4. P. J. Miles, esq; Scotch plough - -	James Hensley	2	54
5. Mr. Dixon - - ditto - - - -	James Kemp	2	18

The depth of the furrow was $4\frac{1}{2}$ inches.

Previously to the commencement of the work, the Committee fixed upon

Mr. Robert Smith, of Wraxall,

Mr. Isaac Champion, of Pucklechurch,

Mr. Thomas Todder, of Westbury,

Good practical farmers, and not interested in the premiums, as proper persons to watch the progress of the experiment; and to point out those two competitors, who appeared in their judgment best entitled to the premiums.

After the dinner at King's-Weston Inn, where a very respectable company were assembled, the Report of the Umpires was read, as follows:

“ King's-Weston Inn, Gloucestershire,

“ June 18, 1813.

“ The Committee of the Bath and West of England Agricultural Society having confided to us the adjudication of their premiums for the two best specimens of ploughing exhibited this day, on the land of Farmer Luton, in the parish of Westbury-upon-Trym, are unanimously of opinion, upon the principles on which all practical farmers ought to judge, that the first premium be awarded to the plough that worked the portion of land, No. 5; and the second premium to the plough that performed on No. 4; as likewise the premiums to the respective ploughmen. We attribute great merit to the other

ploughmen; and think that the encouragement given by the Society to diminish horse labour and consequent expense is highly worthy of public notice.

“ ROBERT SMITH.

‘ ISAAC CHAMPION.

“ THOMAS TODDER.”

This adjudication was received with marks of unanimous approbation. And if ploughing with a strait and equal furrow, and a general stirring of the soil, leaving an even sub-surface, be signs of good workmanship, we must add our testimony to the correctness of the decision; and do therefore beg leave to propose, that this meeting will recommend to the ensuing annual meeting to confirm the same, by awarding,

To Mr. Dixon, the first Premium, - - *Five Guineas.*

To P. J. Miles, esq; the second ditto, - *Three Guineas.*

To James Kemp, manager of the

first plough, - - - - - *A Coat and Buttons,
and One Guinea.*

To James Hensley, second ditto - *A Coat and Buttons.*

It may be sufficient to observe, that it would be difficult to surpass the zeal, skill, and determination of the two Scotchmen, with their favourite and accustomed implement the Scotch plough. We take this opportunity to remark, that it must always remain at ploughing matches in some degree a

contest *between the horses*, however well they may apparently be matched, till a mean be adopted to apportion force to resistance. Other circumstances, however, had their influence in the competition. That James Tanner, who ploughed his half acre in one hour and 45 minutes, had no premium assigned to him, may be attributed to the inferior degree of merit in which his work ranked ; occasioned partly by the obstructing effect of stones in that portion of land he had unfortunately chosen, and partly owing to a mistaken idea (which the Committee took great pains to discountenance) that the most *expeditious* performance would have a prior claim to a premium.

In James Lovell we recognized an old servant, and an acknowledged good ploughman, of the late Mr. Billingsley, and a successful candidate at the ploughing match at Green-Ore Farm. Reluctant to suppose that his advanced age would prevent his strength from keeping pace with his zeal, he maintained an arduous but unequal contest with great, though unavailing perseverance.

The want of success, in the competition, of the iron plough may be in great measure imputed to its manager not having been accustomed to a wheel plough of any kind. The unsuccessful candidates, however, did not go unnoticed. As a token of approbation of their zeal and merits, a small subscription was entered into by the company who dined together, and distributed equally among them

One very gratifying circumstance attended this day's exhibition. Although no conditions were prescribed as to the construction of ploughs, or quantum of force to be employed, *all* the ploughs brought in competition were drawn by two horses *only*, managed solely by the ploughmen with reins; affording an excellent example to the district; and corresponding with the constant endeavours of the Society to shew out of use the absurd and expensive practice of using four, six, and even more horses, where two are found sufficient. The horses that drew the plough to which the first premium is assigned, brought the plough ten miles to the field in the morning, went through the work undistressed, and returned home with their load the same evening.

Although the experiment this year may not appear to have produced any thing particularly novel, either in the exhibition of implements, or in a comparison of different degrees of force applied to various or the same implements, we trust the Society will find enough to convince them, particularly in the testimony of the umpires, that their premiums thus bestowed have a very beneficial influence on that class of society, on the exertion of whose talents so very much depends.

If it will not be thought intrusive, we beg leave while the subject of ploughing, to which the Society have always attached the greatest importance, is on the tapis) to make two or three observations,

As in this Society originated the *term* and practice of ploughing matches, which have been adopted in many parts of the kingdom with very beneficial effects, and particularly by enlightening and calling into emulation the labouring class of agriculturists, of which your Committees, from time to time, have had very pleasing proofs; so we feel persuaded that it will not be averse to increase the respectability and *éclat* of these experiments, as they have been rendered conspicuous through the medium of your volumes: for we have evidence that strangers, that is, persons not members of the Society, have sought after these papers in no small measure, for the sake of what they had heard to have been the effect of your ploughing matches. We think that this end may be attained in two or three ways.

1st. By making these experiments for your premiums more frequent,

2^{dly}. By extending the number of the premiums to the labouring class, and perhaps increasing the amount.

3^{dly}. By making the premiums to the owners of ploughs not *pecuniary* but *honorary*.

The frequency of these meetings will be advantageous to your aim and views. The company are mostly practical men, and the conversation turns chiefly upon practices; interspersed, nevertheless, with the elucidation of such theories as appear likely to produce the best results. At such meetings there

is always a strong impulse to reward even the least successful candidate, if there appear zeal and desire to excel. Might not an extension of your encouragement to this very important class of society be attended with the best effects? As to the remuneration of the owners of ploughs, it rarely happens that the few guineas (especially the lowest premium) offered by the Society are even an acceptable premium. We think we have reason to apprehend that an *honorary* premium would be more gratifying, and induce more extensive competition. You have one in your power, more elegant than most societies can boast. We only *submit* these remarks to the consideration of this and future meetings.

THOMAS GRÆME.

G. W. HALL.

L. TUGWELL.

THOMAS WILLIAMSON.

ARTICLE XIII.

*On the Treatment of a Merino and Merino,
Cross Flock of Sheep.*

[From Mr. GARRETT, in a Letter to the Secretary.]

SIR,

AS it is my intention to be a competitor for some of the premiums of the Bath and West of England Society relating to sheep and wool, particularly premium 7, class x. I send you, agreeably to the requirements of the Society in that case, an account of my flock, and mode of treatment. If it should be deemed worthy of their attention, I shall be happy in having made the communication.

The farm which I occupy is principally hill land, on Salisbury Plain. The customary mode on this situation is to divide the farm into six parts, as follows; first, *sainfoin*, which remains good about six years; then it is broken up, cleansed, and turnips sown on it. The second year *tares*; third, *wheat*; fourth, *turnips*; fifth, *barley*, sown with grass seeds, and broad and Dutch clover, trefoil, and ray, which lie two years for feeding, and then the ley is broken up for wheat. But previous to the breaking up the *sainfoin*, it is always necessary to lay down the

same quantity of land to insure a constant supply of hay. Besides the piece laid down to sainfoin, the other five pieces in succession are turnips, barley, and grafs, two years wheat. This is my regular mode. In addition to the arable land, I have about 150 acres of down land for feeding my sheep. My flock consists of 950; namely, about 450 of cross-breed from Merino and South-downs, and 500 pure Merino purchased and bred from his Majesty's flock. Many of my friends have made several objections to Spanish sheep; 1st, say they, "*it is impossible for them to live on our cold high hills in the winter, and endure folding.*" As I have been a great advocate for Merino sheep for some years, I promised them to give the sheep a fair trial, as I knew by experience (on a small scale) they were capable of enduring hardships with any sheep in this country. In the month of October 1812, I began folding about 200 Merino ewes, and about 100 Merino cross ewes, on as cold a hill as any in this part of the country; they were regularly folded every night on that situation till the end of February 1813; then the flock was brought to the low land for the ewes to drop their lambs. These sheep had but very few turnips, (which they partook of in the day in a distant field,) with which they had threshed hay and barley straw till Christmas. Notwithstanding they were kept so badly on this exposed situation, not one of them died. This I did, though it was

cruel treatment to my flock, in order to convince my friends and the world that they would endure such hardships; whereas in a similar situation, and under similar treatment, some other breeds of sheep would have died. As the objection by this experiment is set aside, and they are proved to endure the coldest situation, and bear regular folding, their credit and value in these respects are established. The Spanish sheep are clothed from head to foot, which points out, in nature, they are more able to bear the cold than sheep that have no wool on their legs, and very little about the belly, neck, and head.

The second objection made to Spanish sheep is, that "*they carry but little manure to the fold, and even that is not so valuable as from the larger sort of sheep.*" It is certain they do not eat so much as larger sheep, consequently there is not so much manure to be expected, in proportion to an equal number of each sort: but in proportion to the weight of the sheep, so will be the quantity of food consumed, if they are of the same age and condition. Therefore it appears to me that two South-down sheep eat as much food as three Merinos. In consequence, I fold 300 of the latter on the same piece of land as I used to pen 200 South-downs on. According to the quantity of food consumed will be the return of each flock to the land. I judge of the *quality* of the manure from my crops of corn, which are equally as good as when I kept a South-down

flock; this objection, therefore, does not weigh with me.

Third objection. "*The mutton, it is said, is so bad, the Dogs will not eat it, if put to the trial; and the sheep cannot be made fat.*" In the autumn 1812, an old experienced farmer on grazing land called on me to see my Spanish flock. I shewed him one of my best ewes in particular: he laughed and ridiculed them as long as he thought proper, observing, "the best sheep there would not be more than enough for his family's dinner, though they were but few in number. He should be ashamed to see them in his field. What signifies, said he, having a fine coat, and nothing for the belly? They may do for gentlemen's parks, but they are not fit for you." I invited my visitor to take a luncheon, which he cheerfully did. I put a piece of mutton before him, and he ate very heartily of it, exclaiming against the Merino mutton from what he had heard, and observing "my meat was very fat, tender, fine in the grain, and rich as venison." I had a friend sitting by who heard the conversation; to whom I observed, after the other was gone, that the mutton he had been feasting on was a part of an *old Merino ram*. Instead of prejudicing me against them, this and other subjects of conversation, with experience, establish my confidence in them. I hope to see the day when Spanish mutton will sell for more money than any other sort.

The fourth objection urged against Merino sheep is, "*that the wool becomes coarse from the climate and soil.*" It is certain the climate does not injure the wool. That is not the cause of deterioration. The wool exported from Saxony is equally good as that which grows in Spain. I have sheep, the breed of which have been in England twenty years, and the wool equally good as any imported from Spain. I think this a sufficient proof that the climate is *not* the cause of its becoming coarse. The soil, such as is generally used for breeding flocks, is poor land, and on such the wool does not deteriorate.

On rich, deep, grazing land, I have observed Merino wool considerably injured. I sold a ram to S. Watts, esq; near Yeovil. In the next year I visited that gentleman, and inspected the sheep; I found the staple longer, and the hair rather larger. The second year the hair larger than the first, and the staple longer. His land is very rich, deep, and good. Such land is generally used for grazing, and not for breeding; therefore in fatting them the injury will be but little, as it is likely the loss in its coarseness will be made up by a greater quantity. It is of the greatest importance to procure a regular annual supply of food for a flock of sheep. My mode is as follows: To endeavour to have a constant supply of green crops, I sow tares at five different times on my low land: 1st, Tares in September; 2d, Winter tares in February, about the latter end;

3d, Spring tares in March; 4th, some time in April; 5th, latter end of May, when there is a regular succession of feed. Turnips sown in May and June to finish.

In the next winter, every sheep will be on the hill as usual; but I intend in future to give them good hay, and constantly to keep them well, in a fair working way. After my experiment had taken place, had I found the Merino sheep did not answer, it was my intention to get rid of them immediately, and purchase a flock of some other breed. Whenever I am convinced of an error, with haste I will retract it. Many persons have insisted on it, that the Merino ewes are bad nurses, and give but very little milk. I have found them very good nurses, and never had so little trouble with any ewes in taking to their lambs. It cannot be expected for a small ewe to have as much milk as a large one, but I believe their milk is richer than that of any large sheep; and on an experiment of taking an equal quantity of both sorts, it will be found to be the case; similar to the Alderney, or any small breed of cows with a fine coat, compared with one of a large coarse coat of hair. It will be found, the finer the hair in the different sheep, the finer the grain of the meat, and consequently more tender and rich. Some gentlemen have been discouraged from keeping Merinos, because they have had the foot-rot; but this is easily accounted for, by their lying constantly in wet

grafs. If they were put into a fold by night, or not let out in the spring or summer till the dew is off the grafs, I should not be afraid of the rot in the feet. This is generally a preventive." In the difeafe, my mode of cure is to cut away the dead ragged part of the hoof, but to be careful not to cut too near the toe vein, or to make the foot bleed ; and apply to the part affected, every day, a mixture, as follows :

2 ounces of the beft gunpowder,
1 ounce of blue vitriol,
1 fpoonful of fpirit of turpentine,
mixed with about a quarter of a pint of crab
verjuice or vinegar ; which with me has never failed
of a cure,

The deterioration of wool arifes from two caufes, The firft and greateft (from my obfervation) is from an improper felection of rams ; many breeders having felected the *fineft framed* fheep, without regard to the wool ; and the wool has degenerated every year, and the foil and climate (of Wiltfhire) fuppofed to be the caufe, when both are blamelefs. I refer to South-down fheep, which were brought from Suffex, Of thefe things I have been eye-witnefs, having been in the praftice, for fome years, of attending the fheep-fhearings in thefe parts, and particularly examining the wool. But where the agriculturift has been careful in felecting a ram with a fuperior

fleece, there it is evident the wool becomes fine. In proof of this observation, I can refer with great satisfaction to the practice of two highly respectable gentlemen in this neighbourhood, Joshua Smith, esq; M. P. and John Gale, esq; of Stirt, whose flocks have been every year improving in the quality of their wool, owing to a judicious and spirited selection of rams.

I kept six rams (three of them fine Merino, and three of the Merino crosses) for one year, on clover, tares, turnips, hay, and *pasture*. The soils on which they were kept, sand, chalk, and clay. The weight and quality of the wool were nearly the same as the year before, when they lived on clover, tares, a few turnips, hay, and on poor down lands. For one of the above sheep, I obtained a premium from the Wiltshire Agricultural Society, at their late meeting holden at Devizes.

The *second* cause of the deterioration of wool I have pointed out, in answering the objection to the wool becoming coarser, where the sheep are kept on rich, deep, grazing land, where it is practicable to breed; but for those who occupy such land, to purchase sheep at a proper age to graze on that soil. I occupy both high and low lands, have kept sheep on both situations, and do not find land of a middling quality deteriorate the wool. My improvement in fine wool has been by selecting the

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finest coated ram, the success of which was evident every year, by the variation of the stock got by different rams.

I am, Sir, most respectfully,

Your obedient servant,

C. GARRETT.

Lavington, Oct. 1, 1813.



PREFACE.

IT has been customary to place at the end of each volume, a recapitulation of the Premiums and Bounties awarded at the different Annual Meetings that have intervened between volume and volume, which custom (to complete the record) has been followed in the present work. But it has been thought proper, that in future every volume or part of a volume should commence with the proceedings of each preceding Anniversary, as in the present instance is done. This will be deemed an improvement; inasmuch as it will include, at least, an extract

from the President's Speech, which is always found to contain some eloquent representation of the acts of the Society, its own celebrity, and its advantage to the community.

It is presumed that the articles here inserted will be found informing, ingenious, or in some way useful.

As a furtherance of the plan which was commenced last year, the second part of the thirteenth volume of the Society's Papers is now published. In aid of this (as was warmly expected) the Essay on the Commutation of Tithes, by the Rev. James Willis, of Sopley, Hants, to whom was presented the Bedfordean Gold Medal at the last Annual Meeting, has largely contributed. The encouragement thus given to authors to display their talents on subjects proposed by the Society, has had the good effect of producing essays from five competitors for this honorary reward in the present year, which are under the consideration of a Committee; one among them will

most probably be found worthy of the prize; in which case it will find similar honour done to it, by its being placed at the commencement of a succeeding volume. There is therefore a fair prospect of being able to put forth a volume, or part of one, annually; whereby interesting communications will be more speedily made to the public, and the Society be more fully satisfied of the propriety of easing their funds, by paying (as has been formerly determined) part of the price of such publication.

The scientific and ingenious are earnestly invited to communicate with the Society, who will be happy to transmit any valuable efforts of their talents, through a medium which is acknowledged to have produced abundant good effects.



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ARTICLE XIV.

Proceedings of the Annual Meeting 1813.

THE Annual Meeting of this Society was holden, at their Rooms in Hetling-House, Bath, Dec. 14th, 1813,

The PRESIDENT in the Chair;

PRESENT ALSO,

Sir J. C. Hippisley, bart. M. P. F. R. S. W. G. Langton, esq; M. P. Wm. Dickinson, esq; M. P. Sir J. W. Smith, bart. Wm. Dyke, esq; Wm. Clavill, esq; Dr. Parry, C. G. Gray, esq; J. P. Paul, esq; T. Joyce, esq; Rev. Mr. Barter, T. Græme, esq; vice-presidents; T. G. Estcourt, esq; M. P. Sir Wm. Cunningham, bart. Major-Gen. Sir Wm. Cockburn, bart. Sir J. Hawkins, bart. — Baker, esq; M. P. — Baillic, esq; M. P. T. Calley, esq; M. P. Lieut.-General Kerr, Charles Knatchbull, esq; Thomas Smith, esq; — Browne, esq; J. W. Weston, esq; J. Biggs, esq; G. W. Hall, esq; John Gordon, esq; E. Greathed, esq; John Bennet, esq; president of the Wiltshire Agricultural Society; and a large assembly of intelligent and spirited Agriculturists from the Western Counties, and different parts of the kingdom.

Sir B. Hobhouse, bart. M. P. F. R. S. &c. &c. was unanimously re-elected President.

A vacancy having been declared in the Vice-Presidency by the death of Colonel Leigh, Thomas Grimston Estcourt, esq; M. P. was elected in his stead. All the other Vice-Presidents were re-elected, as were the permanent Committees, with the addition of some other names.

The Honorary Premium of the BEDFORDIAN GOLD MEDAL had been offered for the best TREATISE ON the COMMUTATION OF TITHES. For this premium there were two candidates. The Committee to whom the examination of these treatises had been referred, reported, "that the Essay bearing the following motto,

"Nunquam aliud Natura, aliud Sapientia dicit,"

"was worthy of the premium;" which was confirmed accordingly. On the sealed paper being opened by the President, the author's name was found to be the Rev. James Willis, of Sopley, near Ringwood, Hants.

At the dinner that gentleman's health was drank with great respect and eclat. In returning thanks, the Rev. Gentleman avowed that his motives for writing this Essay were the credit of religion; the promotion of harmony and good-will between Clergymen and their Parishioners; and the hope of obtaining the honour of that premium, which had this day been conferred upon him. (*Great applause.*)

The first step of the Society on the subject of TITHES having been so successfully proceeded in; it was resolved that the same premium be continued, in order that all possible light that could be thrown on the subject might be acquired; and a Committee "for promoting the Commutation of Tithes" was chosen, to communicate with various parts of the country, on a measure which tended to produce public good and private happiness, the general interests of agriculture, and above all, the advancement of morality and true religion.

One of the highest premiums (except the Royal Patron's) was successfully claimed this year; namely, the PRESIDENT'S PREMIUM for exhibiting "*The best Bull and Cow, with one of their Offspring, all of the same breed.*" The Society confirmed the recommendation of the Committee on Live Stock, by awarding this premium, *Twenty Guineas*, to Mr. Richard Reynolds, of Shobrook, Devon, for his meritorious exhibition. The cattle had travelled upwards of eighty miles.

Upon its being announced that the Stock exhibited by Mr. Reynolds had been thought by the judges deserving of the President's Premium of Twenty Guineas, the President rose, and among other remarks, said, "The Society will recollect that, when in the year 1806 it did me the honour to accept from my hands a donation of One Hundred Guineas, in addition to my annual subscription, an

“ order was made that this sum should be added to
 “ our amount in the public Stocks, and that the
 “ interest of it should be applied to the payment, or
 “ should go in aid of the payment, of a premium of
 “ twenty guineas, to be called, in honour of myself,
 “ the President’s Premium. This is the first time,
 “ Gentlemen, that the premium so distinguished,
 “ has been successfully claimed ; and I avail myself
 “ of the opportunity to declare that it has long been
 “ my resolution, as is well known to some, to take
 “ upon myself the discharge of it, as often as it
 “ might be awarded. Most gladly shall I now pay
 “ the Twenty Guineas, and I trust and hope this
 “ will be the case every year. Thus the Society,
 “ whose utility will always be in proportion to its
 “ finances, will have the power of applying a fur-
 “ ther sum to the great national purposes for which
 “ it was established, and I shall be a great gainer
 “ by the satisfaction and pleasure which I shall ever
 “ derive from the part which I have taken on
 “ this occasion.”

The generosity of the President was received with the warmest applause, and the thanks of the Society unanimously voted to him.

On the recommendation of a Committee, a Silver Bedfordean Medal was awarded to John Bennet, of Pit House, esq; as an Honorary Premium for an excellent Crop of Turnips ; and as an expression of the Society’s approbation for the good management

of his farm, his general liberality of conduct, and high example in the way of improvement, of which such honourable mention had been made by the Committee,

The following PREMIUMS and BOUNTIES were awarded to sundry claimants under the different classes, in confirmation of the reports and recommendations of Committees and General Meetings in the course of the year ; namely,

Under CLASS I. (*Agricultural Operations.*)

To Mr. Tho. Dickson, the first premium obtained at the Ploughing Match, this year, *Five Guineas.*

To P. J. Miles, esq; the second, *Three Guineas.*

To James Kemp, manager of the first plough, a Coat with the Society's buttons and One Guinea.

To James Hensley, manager of the second plough, a Coat and buttons.

To John Bennet, esq; for ploughing a large quantity of land with a pair of oxen abreast, driven by the ploughman, *Five Guineas.*

To Sarah Cole, for reaping $3\frac{1}{2}$ acres of Wheat, *One Guinea.*

To James Tyley, for Shearing Sheep at the Cattle-yard in June, a Coat with the Society's buttons, and a premium of One Guinea.

To George Ford, for ditto, a Coat and buttons, and a bounty of One Guinea,

Under CLASS IV. (*Live Stock.*)

To Gabriel Stone, esq; of Somerfet Farm, for the best fat Ox, a premium of *Eight Guineas*.

To Mr. Batt, of Theale, for the second best ditto, a premium of *Four Guineas*.

To Mr. Wheller, for exhibiting a good fat Ox, a bounty of *Four Pounds*.

To Mr. R. Brooke, for the best fat Cow, a premium of *Four Guineas*.

To Mr. Large, for the best fat Wether, (Leicester breed,) a premium of *Six Guineas*.

To Mr. D. Hayward, for the 2d best ditto, (Leicester and Cotswold,) a premium of *Three Guineas*.

To Mr. D. Hayward, for the best fat Ewe, (nearly true Spanish,) a bounty of *Two Guineas*.

To Mr. Garret, for exhibiting a pen of breeding Ewes, (Leicester, Spanish, and South-Down crosses,) a bounty of *Five Guineas*.

Under CLASS V. (*Wool.*)

To G. W. Hall, esq; (for exhibiting a pen of fine-woolled Shearling Rams, (Merinos bred in England,) a premium of *Ten Guineas*.

To Mr. Garrett, for exhibiting the most valuable Fleece of Wool from a British ram, a premium of *Five Guineas*.

To ditto, for a Ewe's Fleece, a ditto, *Three Guineas*.

To Mr. R. Whittington, of Monckton-Combe, for manufacturing the finest and best piece of Navy Blue Cloth, from any wool of the sheep tribe, grown in the united kingdom ; a premium of *Ten Guineas*. The cloth was made from the wool of Col. Serle.

Under CLASS IX. (*Industry and Good Behaviour.*)

To Wm. Harris, Alcester, for 45 years faithful servitude, a premium of *Three Guineas*.

To James Neate, Freshford, for 23 ditto, a premium of *Three Guineas*.

To Stephen Curtis, Godminster, for 34 years as labourer, ditto, *Three Guineas*.

To Wm. Kinger, a peculiar case as labourer, a bounty of *Three Pounds*.

To James Bird, shepherd, for rearing lambs, a premium of *Three Guineas*.

Under CLASS X. (*Essays.*)

To Mr. Garrett, for an account of his treatment of a Merino and Merino Cross flock of sheep, a premium of *Ten Guineas*.

In the line of Mechanics, two Threshing Machines were exhibited, namely, a Patent Portable Threshing Machine, made by Morris and Shelly, of Downton,

Wilts; and a Patent Rolling Machine for the same use, made by Todd and James, Bristol. On these machines the Committee reported as follows; that according to the best of their observations, supported by the evidence of a most respectable Member of the Society, the large Horse Machine possesses a considerable degree of merit, as performing its work well, though not in quantity (proportioned to the power employed) equal to machines already in use. Its portable quality is a great recommendation.—That the Patent Rolling Machine made by Todd and James is on a new, and as appeared to them, on an excellent principle; but as no sufficiently extensive experiments have yet been made on it, it could only be recommended to encouragement and public attention.—Being *Patent* Machines, they are, according to the usage of the Society, not inserted in their list of premiums; but the Society, on account of the considerable share of merit which each machine possesses, awarded a bounty of 10l. to the larger machine, and 5l. for the rolling machine, towards defraying the expenses of the exhibitors.

The Committee also reported, that the new mode of adopting Hoop Iron to the purposes of Gates and Roofs, (specimens for which were exhibited by Mr. Pearfall, of Willbridge,) appears to be a most valuable substitute for timber; as being less weighty, free from all danger of dry rot, and more secure from the ravages of fire.

At a late period of the Meeting a very ingeniously constructed addition to a Cramp, so as to be accommodated to all kinds of levelled Carpenters' Work, was exhibited: very worthy the attention of all cabinet-makers.

The Committee on Cloth and Wool reported, that the ten fleeces of wool from shearling rams, exhibited by G. W. Hall, esq; for Pr. 1, Class 5, was very valuable clothing wool, and justly entitled to the premium.

That the Twelve Fleeces exhibited by Dr. Parry, for the inspection of the Society, but not for premium, were very fine.

And that the piece of Merino Blue Cloth, exhibited by John Bennet, esq; of Pit House, not in competition for premium, possessed superior excellence, both as to fineness of wool and quality of cloth, and that he was entitled to the thanks of the Society,

New Members since last Report.

Major-Gen. Sir Wm. Cockburn, bart,

J. J. Farquharson, esq; president of the Dorset A. S.

R. E. Coote, esq;

John Finley, esq;

H. Elwin, esq;

T. Walters, esq;

H. Hill, esq;

Tho. Calley, esq; M. P.

Peter Lauder, esq;

W. L. Caldecot, esq;

James Ewer, esq;

Capt. A. G. Fisher,

Phineas Bury, esq;	J. C. Hayward, esq;
Wm. Perry, esq;	Charles Paul, esq;
Mr. Thomas Dickson,	Uriah Messiter, esq;
W. Prideaux, esq;	George Messiter, esq;
R. Whittington, esq;	F. Brooke, esq;
Rev. R. Warner,	Major Cavenagh,
Dr. Fraser,	Rev. W. F. Grove,
A. J. Kerr, esq;	Rev. Dr. Barry,
T. G. Lowder, esq;	G. J. Kneller, esq;
Lieut.-Gen. Broderick,	Col. Thornhill,
Chas. Connolly, esq;	R. W. Bridgman, esq;
Richard Shute, esq;	H. Wilkins, esq;
Rev. Paul Leir,	Mr. James.
T. M. Leir, esq;	

The Book of Rules, Orders, and Premiums, having undergone a revision by the Superintending Committee, assisted by other Gentlemen, the alterations and additions recommended by them were confirmed. An important alteration was particularly made as to the exhibition of Live Stock. In future the animals are to be judged of ALIVE, as is the case in other great Cattle Shews; whereby it is conceived a greater competition will be excited; and much time and labour saved to the Committee who may be appointed adjudicators of the Premiums.

The Thanks of the Meeting were unanimously given to the Committee of Superintendence for their

labours through the past year, and to the Committee on Live Stock, and the other permanent and occasional Committees.

The First Part of the 13th Volume of the Society's Papers and Transactions was delivered to the Members on the terms proposed and resolved on at former Annual Meetings. The regulation was universally approved; and it is intended to issue the second part in the course of the ensuing year, and to continue such practice as often as their ingenious and intelligent correspondents may by their labours enable them to fulfil the design.

The State of the Society's Funds was laid before the Members, and approved.

The Thanks of the Meeting were given to the President for that important aid which he is continually bestowing on the affairs of the Society; and for the zeal, discrimination, and impartiality, so conspicuously manifested during the sittings of this anniversary.

By order of the Society,

R. RICARDS, Secretary.

*Sketch of the PRESIDENT'S Speech, on his Health being
drank after Dinner on the day of Annual Meeting.*

IN the opening of his Speech he stated, that he found no difficulty in expressing his great gratification in seeing himself surrounded by such an uncommonly numerous assembly of respectable Gentlemen ; but he knew not in what terms sufficiently to thank them for the reiterated proofs which they afforded him of their favourable opinion, and personal attachment. He was proud of their approbation, and grateful for their kindness ; and both together operated as a cordial to his heart. If it were true, as it unquestionably was, that it was better not to be accepted at all, than rejected after trial ; what must be his degree of enjoyment upon being accepted after such repeated trials, upon seeing himself, after so many successive years, again called to the chair of this noble Institution ! But though, from having been so often the object of their unanimous choice, he could not doubt that he had been, in some degree, useful to the Society ; yet he trusted he might say without offence, that they considerably overrated his services. It was the amiable propensity of great minds to estimate too highly the merits of others, and to undervalue their own. While they bestowed praise on him, they forgot how much the Society owed to their own exertions ; *they* forgot, but *he* could never forget, how much he was per-

sonally indebted to them for the liberal assistance which they afforded him, without which it would be impossible for him satisfactorily to fulfil the duties of the high station to which they had called him, or in any degree to advance the excellent purposes for which the Institution was established. For that important aid, so constantly wanted, and so willingly and so graciously accorded, he begged them to accept his gratitude; and for their many and great acts of personal kindness, to accept his affection.

Speaking of the Society, and the numerous advantages which had flowed from it, he said, that as it had now existed for the space of 36 years, no proof of its beneficial tendency could be wanting. Had it not been erected on the most solid basis, it would long, ere this time, have been annihilated.—Institutions, having no foundation in reason and sound principles, lived, comparatively speaking, but for a day. The subscribers, seeing no adequate return in utility for the funds which they contributed, dropped off, one by one; and the establishment fell into gradual decay, and final ruin: the very contrary had been the lot of this Society. The subscribers had numerously increased year after year; admission into it had been sought by the powerful, the wealthy, and the wise; similar Institutions of the most respectable nature had desired to correspond with it; and distant nations acknowledged their obligations for its communications. In illustration

of this latter observation, he had only to refer to the letter of Judge Peters, the intelligent President of the Philadelphia Society, this day read; and to express an ardent hope, that by the return of peace, an opening to the most free interchange between the two Societies might speedily be restored.—
(Hear! Hear!)

In addition to this argument in favour of the utility of the Society, arising from its long existence and general estimation, he might state, he observed, that to invite agricultural experiments by means of premiums, and to communicate the results to the world, was one of the great ends of the Society; and that numberless instances could be produced to shew that it had not failed of success. But he added, “rather let me, instead of entering upon an unnecessary undertaking, and a superfluous detail, confine myself to the customary line of my duty on this day, and notice the most prominent events of the year which is past.”

He would not, he observed, dwell upon the painful failure of their Motion to Parliament in favour of a General Inclosure Bill. When he considered how often a measure of that kind had been rejected in the House of Peers, his feelings were those of acute despondency; but when he recollected how strongly it was bottomed in good sense and sound policy, he experienced a lively hope, that it *must* finally receive the sanction of every branch of the Legislature.

The other events of the year which he should have occasion to mention, raised no other than pleasurable sensations.

He was most happy to find that the Premiums offered by the Society had brought forward such a number of candidates. In proof of it he quoted many instances, and among them the several claims for Live Stock, and the Essay on a Commutation for Tithes for the Bedfordean Medal.

In noticing the claims for Live Stock, he spoke of the increase of the number of animals exhibited, and their superiority of quality; and attributed these effects, in a great measure, to the augmentation of the amount of the premiums, which produced competition from a greater distance. He praised also some new regulations which were made this year, and from which he expected great benefit.

Adverting to the Commutation for Tithes, he rejoiced, he said, that an Essay on that important subject had been deemed worthy of the Bedfordean Gold Medal; and particularly that the author of it had proved to be a respectable Clergyman of the Established Church, who was President of an Agricultural Society, (the Rev. James Willis.) He pointed out how tithes sometimes operated as a tax upon the farmer's loss, and what an impediment they were to agriculture; and shewed, that in a moral point of view, they did not merely render the spiritual labours of the pastor useless, but by promoting

strife and acrimony, and raising an odium against the Clergy, created disgust against religion, and converted it into an instrument for promoting irreligion and vice.—Still, however, no change ought to be made, until a secure, honourable, and full equivalent can be found; and no plan should have his sanction, which did not effectually protect, and adequately provide for, the just rights of the clergy.—(*Hear ! Hear ! from every part of the room.*)

Among the interesting events of the year, he mentioned also the establishment of a new Farming Society in Wiltshire; and the publication of the first part of another volume of the Society's Transactions.

He represented this new Society as an additional proof of the utility of the Bath Institution. He called it a scion from that stock; and said, that being thus derived, it must produce good and abundant fruit. He added, that the Bath Society would ever feel for it a parental fondness, would watch its proceedings with the greatest anxiety for its success, and lend its hearty aid to the promotion of it; and took occasion to pass a high encomium on its President, sitting opposite to him, (Mr. Bennet,) for his abilities and public spirit.—(*Hear ! Hear ! Hear !*)

When he came to speak of the appearance of the new volume, which, though he noticed it last, was not, he said, to be reckoned inferior in interest to any of the other events of the past year; he used, as nearly as we can recollect, the following language.

It might, said he, justly have been expected, that an association formed for such noble purposes, and composed of gentlemen possessing talents of the highest order, and looking to no other emolument than the pleasure of doing good, would produce fruits worthy of national admiration and gratitude. Accordingly the twelve volumes of your Transactions which have already seen the public eye, have received the stamp of public approbation; another addition to the rich produce is now before us. What a body of useful knowledge is concentrated in your records! There the tenant, accustomed to pursue the common and beaten track of husbandry, may learn whether enlightened experience be in favour of it; and derive either confirmation of his practice, or extrication from his prejudices and errors. There the landlord may learn the mode of improving his estate, by means of which he may enrich himself without injuring his tenant, and render a benefit to the public by augmenting the general stock of human sustenance. There the statesman also may derive the most useful information. It is observed by the late General Washington, then President of the United States of America, in a letter to Sir John Sinclair, that he knew no pursuit in which more real and important service could be rendered to any country, than by improving its agriculture, its breed of animals, and every branch of husbandry. These are, I believe, nearly the words which he uses. Gen. Washington

well knew, and every sensible statesman well knows, that although the national resources supplied by manufactures and commerce are highly to be valued, yet agriculture produces more solid revenues ; revenues not precarious and dependent upon the accident of public taste or fashion, but steady, certain, and efficient when other expedients prove unsuccessful ; and that it exalts a state above other states, by enabling it, after satisfying its own wants, to apply its surplus to the relief of their necessities. If then it be true, as it undoubtedly is, that to promote agriculture is to augment the riches, population, and power of a nation, with what satisfaction will every political economist, nay, every genuine patriot, discover in your volumes an authentic body of facts, displaying the most effective means of making the earth produce the greatest quantity of useful vegetables at the cheapest rate ; and while they peruse your pages, they will duly appreciate your labours, and class you amongst the best lovers of your country, nay, amongst the best benefactors of the human race.—(*Repeated marks of applause.*)

ARTICLE XV.

Prize Essay on the Commutation of Tithe.

In claim of the Bedfordean Gold Medal, 1813.

[By Rev. JAMES WILLIS, of Sopley, Hants.]

To Sir BENJAMIN HOBHOUSE, Bart. M. P.

F. R. S. F. A. S.

*President of the Bath and West of England Society for the
Encouragement of Agriculture, Arts, Manufactures, &c.*

“Nunquam aliud Natura, aliud sapientia dicit.” *Juv.*

SIR,

I Have great pleasure in addressing a gentleman of high talent and eminent ability, fortunately presiding over the concerns of a Society, which, collectively and individually, is no less ardent and zealous than yourself in its attachment to the cause of agriculture; and has uniformly exhibited to the world the most firm and lively interest in whatever promises to benefit our fellow-creatures.

The solicitous attention your Society has continually shewn on the *two* great subjects of *Tithes* and a *General Inclosure Bill*, so strongly recommended to the notice of the public, ful

proves how anxious all your endeavours are, and always have been, to ameliorate the oppression of the *one*, as well as to urge the *immediate* execution of the *other*, when the complete attainment of *both* these objects would at this moment be considered of the *first* importance to the happiness and prosperity of this kingdom.

Certain regulations in Parliament have lately given much facility in passing *local* Inclosure Bills, in a great measure attributable to your perseverance. But the subject of *Tithes*, demanding our most serious attention, still remaining unimproved, except in a few instances: some people conceiving the system to be inviolable; others to be perfectly unalterable, as involved in insuperable difficulties; many deeming them the greatest possible impediments to the interests of agriculture; and as such, while they remain in their present oppressive form, the evident *opprobrium senatus* —.

Under these impressions the task is truly arduous to recommend any change for the better; but if we utterly despair of any amendment, nothing will be seriously or spiritedly attempted in the church or in the state, and we may basely sink under any ruinous system, while we possess the means, if we have the courage and prudence to adopt them. Agricultural evils, like those of the human body, are to be cured by proper vigilance and active measures wisely applied; and if we relax a little in our old habits and

prejudices, there is no case, however desperate, but what some remedy may be found to alleviate the malady. If we refuse the remedy, we are the authors of our own misfortunes, and ought to bear the evil with fortitude and patience. I hope it will not be considered as too presuming in any individual, particularly in an *ecclesiastic*, to offer his sentiments, founded on fact and on experiment, on the great evil the agricultural world now complain of, namely, *Tithes*; when the experience of the writer, as well as that of his parishioners, can mutually congratulate each other of having enjoyed for many years much comfort and advantage in the labours of the field, by generally adopting a *Commutation of Tithes*, in the stead of taking them in kind. When the *good* of the whole empire is the point to be considered, no opinion or fact, I humbly presume, ought to be withheld from public investigation, that may tend in any way to advance the interest of the *whole*. The clergy, as well as the laity, are bound to contribute any information they may respectively possess, and both patriotically make some personal sacrifice for a permanent benefit to their country. Individually feeling much happiness from the many advantages arising from the *Commutation* of Tithe, I must beg leave to submit them with much deference to the judgment of your honourable Society, entreating that indulgence which the difficulties of such a subject will naturally require. Deeply impressed with this idea,

I have entered the *arena* with no small anxiety, and the motive alone must apologize for any errors or defects. The following observations may be supposed by some to come but strangely from the pen of a clergyman, holding a *Tithe estate*; but I cannot sacrifice the *truth* in complimenting any system of our establishment, however ancient the institution, by giving it excellencies which it has not, or by concealing the deformities or inconveniences which it has. I consider *Tithes*, in their *present* shape, as most highly prejudicial to all the interests of agriculture, and consequently to the welfare of my country; and at this moment more particularly so, because now the exigencies of the state absolutely require a most spirited extension of the culture of our soil, to feed the wants of an increasing population. But let it be most perfectly understood, that I am not one of those idle visionaries who hope for a total abolition of Tithe; my only wish is to see a *general commutation* throughout this kingdom, founded only, in which it can be reasonably expected to exist, on a just and fair equivalent, and honourable compensation: perhaps those who wish for *any* other change, probably desire the utter subversion of every thing that constitutes good order and substantial government. As we improve in civilization, things progressively change, and must, so as to meet the necessary wants of a people, or the pressing demands of the empire. But even in extreme cases

no public or private right can be justifiably invaded, much less forcibly violated, without the most ample returns of the fullest compensation. This very consideration of the violation of *private* rights has been, perhaps, hitherto the only cause of not effecting any desirable change, (with regard to tithes,) and has constantly interrupted the accomplishment of any Parliamentary measures, the most likely to introduce a better system : and until these claims can be duly satisfied, there are but small hopes of any radical change to be *legally* authorized; no measures indeed of relief, but what the tithingman or the tithe-holder may mutually agree to with the respective parties of whom they take the tenth.

The period may shortly come when the real necessities of the State will be maturely weighed against the rights of individuals, by those whose duty it more immediately is to provide for the good and comfort of all. The result of this investigation may ultimately discover some beneficial arrangement and mode, founded on the wisest scheme of human policy, of justly commuting these great obstacles to our growth of grain, for the support of the people. Under an equitable arrangement to all parties, sanctioned by the legislature, the individual could sustain no injury, but the people the greatest possible advantage ; and where the existence of millions is the great stake, this weighty

consideration must, at all times and in all cases, supersede the private emolument of any individual.

Tithe (taken in kind especially) has wonderfully operated in checking a due course of husbandry on our *old* lands, besides forming one of the greatest obstacles to the improvement of the *new*. But the mischief extends much further than the shortening of our crops; our population is lessened also by the neglecting the cultivation of our wastes, the very means we now more especially want of raising more supplies, and more people to consume them.

In some parishes where tithes are compromised, or fairly commuted, by land, or composition in money or grain, a full scope is given to the farmer's exertions; and where *new* lands have been enclosed and cultivated under such proper legal regulations, the taxes arising from these have come in aid of the *old* levies, and considerably diminished the pressure of taxation. The poor-rate, indeed all other levies, governmental as well as parochial, naturally feel the effects of an extended cultivation: besides, many other incalculable advantages would very seasonably afford us those very treasures we now so much want. We may judge, in some measure, of what has been hitherto done in the united kingdoms, where inclosures have taken place, and tithes have been *properly* arranged, when Ireland and Scotland have imported into this country, during the last five years, as much corn as constitutes one

third of our whole importation. We have also the evidence of those well acquainted with the soil and other local advantages of these countries, that *both* will become eminently serviceable to this kingdom, in affording such abundance of all kinds of food, as will completely relieve us from a shameful dependance on the capricious aid of foreign nations. The fertility of soil, the cheapness of labour, the fitness of climate, are of no avail in any kingdom if due and liberal encouragement is not given to the cultivation ; and the tillage of land cannot be expected to increase in that degree sufficiently to feed a people, where perpetual obstacles to improvement and exertion are permitted to discourage the labours of the agriculturist.

I have known many instances where *new* inclosed lands have been suffered to return to the state of nature after great expense, where the possessor has been intimidated and disgusted in his progress of culture by the severe demands of the titheholder ; whereas, if the demand had not been so rigidly exacted, many thousands of acres would now be producing corn, which at this moment are of no possible use to the public or individual. Thus we see, by the intemperate abuse of a right, an extended growth of grain is completely checked : surely a strong remedy is necessary to control, limit, or commute any peculiar privilege, where the *public* weal suffers so much by *private* exaction. In all *new* inclosure

bills ample provision should always be made for the titheholder, by giving him his full share and proportion of lands so inclosed; where indeed such a measure has been heedlessly or wilfully omitted, many unforeseen difficulties have arisen, which have retarded the operation of the inclosure. The apportioning of lands to the *clergy* in lieu of tithes, in some few particular instances, has been considered as a great hardship, as these lands may be allotted to a clergyman who has neither capital or judgment sufficient to manage or conduct the same in the true spirit of cultivation. To this objection I can only observe, there are but few of my brethren, I sincerely hope, who are in this hapless situation; truly those must be poor and friendless indeed, who could not procure means to cultivate his proportion, if so inclined; and if not, may soon find a responsible tenant to do a duty he owes to himself, to the allotment, his landlord, and the public. The views of the titheholder, either clergy or laity, are not to be *separately* considered, or as distinct from the common interest of the country. Our agricultural interests form a most important part of our national security; and our success in the cultivation of every foot of land in our island is now so closely interwoven with our political welfare, that the subject must be allowed to be incontrovertibly decided as a *State question*. On this ground I am satisfied, as an Englishman, there is no individual who will not cheerfully and

patriotically undergo a small privation in any measures which are manifestly prejudicial to our national good. Compare the advantages and disadvantages of the present system of *tithes*, as affecting the real interests of the individual and the public; under this examination of the question, I am convinced that every Englishman will see the necessity of immediately adopting some rational mode of correcting the existing evil; and even with a view, though more distant than his neighbour, to private emolument. I shall not enter into much argument with those good people who are such strenuous advocates for the *jure divino* of tithes, or for their *immemorial* usage, as this would be uselessly treading much ground that has been too often trod before, without much conviction. In a short answer to both these points I shall only beg leave to use *two* trite, old-fashioned, but very powerful and irresistible arguments :

“Tempora mutantur, et nos mutamur in illis.”

And

“Necessitas non habet leges.”

No consideration of *private* should come in competition with the *public* interest.

It may perhaps be justly remarked, in every nation in which the pure and manly precepts of the gospel are rightly understood, and mutually performed between man and man, that the light of science has

sprung up, and has gradually dispelled those barbarous notions that have usually enslaved the sentiments of man. What indeed is the history of man, but a succession of innovation and amendment, attributable solely to this blessed light? I mean not any innovation that destroys, but that which adds to the happiness of a people; that innovation, which softens the rigour of any antiquated maxim which bears hard on the labours of the people; that innovation, which would give new life and vigour to our national agriculture, and to which all the other powers in *Europe* at present are directing their energy and skill. If a few strong prejudices are to remain uncontrolled, and bigotry is to supersede caution and foresight; we then must be a divided people, and still be content to exist only as a dependent nation on the caprice or bounty of other states, who are already too well disposed to ruin and destroy us. If we are become so enlightened in the other arts and sciences, should we not dedicate more of our attention to the chief concern of the state? A new system may ameliorate many of our grievances, augment the produce of our soil, multiply our cattle, institute *new* trials in husbandry, and such as our experience deems to be preferable are to be used instead of the *old*. Innovations or commutations, if you please, in agriculture, in industry, in useful arts, I may venture to say, *in either*, are not to be resisted because they are *new*;

they are to be fairly tried, and if found beneficial to all, and injurious to none, are to be freely and boldly adopted. If it be allowable, “*fas est et ab hoste doceri,*” we may refer to the present condition of France; notwithstanding the immense armies she has sacrificed in restless ambition, and the great force she is now obliged to keep on foot, still her lands were never better cultivated. Her industry continues to increase, as well as her population; *old* schemes of husbandry are discarded, and *new* ones, adapted to the nature of the soil, are universally employed. This degree of prosperity is principally owing to the *liberal* laws in regard to agriculture, though but lately introduced, by which this great empire is upheld: we are informed, it is to the suppression of *tithes*, the feudal system, the *mains-mortes*, and the monastic orders; a suppression in all respects perhaps not to be justified: but still, what has been the result of these spirited alterations and seasonable changes in their government? France, always tributary to other countries for the greater part of its most essential wants, as England is at present, now raises them within *herself*; and a national impulse is given to her agriculture, manufactures, and public works, that she has never before experienced. These exertions have called forth the infinite resources of that kingdom, and may perhaps have been the means of her

achieving what she has done, and may still do, with the powers of Europe. With such an example before our eyes, and such a people, desperate, artful, and enterprising; we are peremptorily called on to examine, to correct, and alter any custom, right, or usage, by temperate, just, and equal means that may promote a noble emulation among us; the end and aim of all our wishes, to keep us on a firm, safe, and manly footing with our most *inveterate* enemies. That some radical changes with regard to tithe are now wanted to use the whole resources of our land, no person who reflects on the state of the world, can, I think, possibly deny; and tithe, as connected most intimately with the concerns of agriculture, the firmest pillar of the state, stands prominent among our national difficulties, and as such claims our first and earliest attention, to make us equal at least with our opponents, in reaping every possible advantage from our respective soils, which the blessing of Providence has given us. An Englishman, under our mild constitution, has not much reason to apprehend any unreasonable or violent attack on his person or property. We are only called on, collectively and individually, under existing circumstances of time and the pressing public expediency, to submit to a few *changes* which may eventually contribute to the comfort, if not to the preservation of the *whole*; and by which

person, in the progression of such a *change*, or in its results, would experience any deprivation without the most ample recompence and consideration.

Our own *reformation* in matters of religion, our *revolution* in the affairs of government, though *both* were effected with the shedding of torrents of blood; these changes, grand and truly beneficial to the human race, stand high in the annals and records of our country; and the period, though distant, is eminently distinguished by the gallantry, wisdom, and deep penetration of our ancestors. These mighty changes gave a new turn to the manners and characters of that age; and are felt, I hope, with extreme gratitude by every rational Englishman of the *present* day. Will any man living, who knows and feels the real value of the mild and unadulterated pages of the gospel, whose heavenly simplicity is genuine christianity, and which is our only religion, (pure, plain, and unfullied by the artful corruptions of the hypocrite, and the cunningly devised fables of deceitful men,) and the solid blessings of the British Constitution; condemn the reformation of the *one*, or the revolution of the other? Time and opportunity will sooner or later correct most abuses which impede the progress, or mar the beauty, of the wisest system either in the church or state; and no oppression which is adverse to the well-being of a people, can be ever steady, permanent, or unchanged. The diffusion of knowledge

must eventually dispel the mists of error and of darkness, and the sunshine of reason must finally prevail. The cultivation of the soil, like that of the human mind, must be first cleared of every embarrassment, the mummery and the rubbish invented by knaves, enthusiasts, and bigots, before *either* can duly expand. The inquisition of Spain, that horrid instrument of tyranny and oppression in any country, we have just seen, and I hope, as enlightened christians, extinguished for *ever*, even among the most bigoted people. Those lamentable corruptions which disgraced, which deformed their doctrines, such as they were, and made them doubly oppressive, are partly corrected, if not wholly destroyed ; and these blessings have ensued merely from the expansion of knowledge, I trust what has been adduced will be sufficient to prove to the most bigoted advocates of continuing tithes in their *present* shape, who will not even condescend to hear of *any* mode of compromise or exchange, that they are standing forward to oppose the *general* voice as well as the *general* interests of the people.

Persons in exalted stations in the church and state fully digesting the good effects of such an alteration in tithes as may be most likely to meet the wishes of the people, the clergy as well as the laity, would justly merit the highest praises of their country ; the example and influence attached to their rank and character would soon accomplish a work, which.

must eventually fail without such liberal encouragement, protection, and support. From hence, a mild, gradual, and temperate reform must emanate ; from hence, a progressive scheme of commutation may originate, and may be *legally* sanctioned by those only who possess the power of execution. If any arrangements with regard to tithe are in contemplation of the Government, the nature and necessity of the times require promptness and decision ; but these arrangements, if intended to afford an universal freedom to the efforts of agriculture, must be founded on solid realities, not in idle and airy speculation. If Parliament should decline any interference in a matter, at this awful crisis particularly claiming their utmost attention, the parties interested must be still left to their own private adjustments ; which too often leads to much inactivity in the field of agriculture, and no less litigation in the courts of law.

Lord Shaftesbury has told us, “ that variety of “ opinion was not to be cured, and that it was “ impossible *all* should be of one mind.” Fully impressed with this idea, I cannot presume to hope that any plan of the amelioration of tithe, however favourable to all parties, or moderate in its execution, will meet with *general* assent. In the course of this enquiry I shall, however, venture to recommend a plan of peace and reconciliation in the payment of tithes, which I have used with great

satisfaction to myself, and I hope with no less comfort to my parishioners, for many years. I must also apologize, if my opinions appear so presumptuous or strong as to offend the feelings of any man; but all classes of men are now become too wise to be deceived, and too judicious to despise the dictates of *truth*. My brethren may accuse me of treading on forbidden ground, not to be profaned, inviolable by any human policy. The laity who are impropiators of tithe, may charge me with the wish and intention of destroying their antient rights. But a man pursuing the *good* of his country only, which should supersede all other considerations, must firmly and manfully disregard the severest censures of the *one*, as well as the bitterest reproaches of the *other*. It will be perhaps impossible in this investigation not to oppose the opinions of some, high in their notions of privilege and of right, and less exact and more accommodating in their views, and cross the principles of others: still as your Honourable Society has required, most seasonably, the frank and liberal sentiments of every man on this great and interesting question, it would be deemed contemptible to disguise mine, and unmanly to desert them. It has been lately said by a most worthy man, and a learned bishop, that the general right of tithes is founded on the laws of the land, sanctioned by prescriptive usage of nearly a thousand years; and if right can be violated in one case, it can be in another. But

any *commutation*, by corn-rents or the composition of money, with the consent of all parties concerned, is not a violent or forcible deprivation, and does not in any manner violate the right of property in its original state. An honourable and liberal maintenance is most certainly due to the establishment of the national church; ages have continued, and should confirm, such a provision; but perhaps no circumstances for centuries back have occurred, as in the *present* age, to require some certain modifications with regard to tithe. In all political and religious accommodations each party must concede something to expect conciliation; neither can hope for any happy conclusion in the most trifling or serious matter, without receding a little. It is extremely difficult to induce all to think alike, and co-operate for mutual advantage; we are led differently by various modes of reasoning; and the ultimate rule of our several duties, which should terminate in the *general* happiness, is too often influenced by clamour, and overruled by prejudice. This doctrine may appear very extraordinary to those who will yield nothing to the public, and exact all for themselves; who constantly exclaim, if you change the present system of tithes, even in one point, or in any trifling degree, you instantly *commute* a certainty for an uncertainty; and a *commutation* of every thing that is esteemed most valuable and sacred among us, will be the dreadful consequence.

With people of this rigid disposition, and inflexible spirit, who may mean *well*, though they, in my humble opinion, think *ill*, no chance of amendment in any matter of public or private accommodation can be ever hoped, much less accomplished. We may still rely on the indulgence and caprice of the Continent for our daily bread, and the people may feel the misery of famine, until these good and patriotic men will condescend to relax one iota from their deep-rooted bigotry and prejudice. While these prevail, the tithingman discourages the future increase of his own tithe and estate, inasmuch as his rigid demand discourages the general improvement of the kingdom. We must lament that this nation is now suffering extremely in its revenue and product from these narrow and selfish notions; and till these are in some measure sacrificed to the better ideas of the *public good*, I am afraid no great or essential improvements in the commutation of tithe can possibly take place, *but between the parties themselves*. As the Constitution of this country is formed, the titheholder's interest, as that of the farmer, is under the protection of the Legislature; and both may be duly appreciated, so as to contribute more effectually to the wants of the state. The extraordinary situation of this kingdom, occasioned by the state of Europe, demands extraordinary exertions. The usual foreign supplies being arbitrarily denied

us, we are thrown back on our *own* resources ; and to these we must bend our whole attention, even to feed the increasing population of the country. The calamity and the misfortune is then the greater, that any encouragement should be withheld, by our own misconceptions in the policy of a measure, which can be so easily given, for the happiness and comfort of the people. All classes should yield to the perilous necessity of the times ; and however unpopular my humble opinion may be considered, I think the clergy will be the *first* (as they ever have been) to exhibit an example of moderation, for the lay impropiator to follow ; and *both* however may exact less in their demands, when the present welfare and happiness of their fellow-creatures absolutely require it. When we really consider by what means the original proprietors came into possession of their impropriations, we conceive they would have much less reason of complaint than the clergy, who are the only labourers in the vineyard, if some *legislative* alteration *was* immediately to take place, and even legally *enforced* in the form of some commutation ; as these very impropriations which they possess, are the fruits of a violent *change* of the constitution, and no less than the plunder of the church, wrested from the clergy by the rapacity of Henry the Eighth. This dissolution of the monasteries very unjustly enriched the favourites of the king, from that period until now, at the expense of

the people, and gave rise to a tax (a monstrous and abominable evil to future generations) denominated the *poor-rate*, which at this day is little less than six millions a year. It is not necessary to digress farther by considering minutely the merits or demerits of the *Dissolution*, as it would protract these pages far beyond the intentions of the writer; indeed the circumstance has been mentioned, merely to shew that my brethren *alone* (and certainly most unjustly so) should not incur the displeasure of the farming world, whilst the greater part of the revenues of our church are in the hands of laymen. It is well known by agriculturists who have to do with *both* in the arrangement of their tithes, that the clergy who have the *least* share in this ecclesiastical provision, are often more liberal and more considerate to their tenants than the laity, who have by far the *largest* portion, and do nothing but *receive* it. I speak of this indulgence, with regard to tithes, shewn by the clergy to the people, with the greatest pleasure and satisfaction; and to their honour be it said, innumerable authorities will confirm what I have advanced, and I hope faithfully and impartially so, in every county of the united kingdom; and I shall not hesitate in believing, that whenever the time shall come that the greatest sacrifices are to be made in any way for the preservation of these realms, the clergy will not be seen the *last* to offer their hands and hearts in the service of their

country, to the best of their power, talent, and abilities. If things really are, as I have frankly stated ; if I have not too partially overcharged the picture, which I have no inducements to do ; then, I say, the clergy, as a body of men highly useful to the state, are entitled most fully to the esteem and respect of the people.

After what has been said in the foregoing pages, a plan or mode of *commutation* will naturally be expected to be submitted to the notice of your Honourable Society ; and I feel as much pleasure in submitting my mode of *commuting* tithes, as your Society can possibly feel in requiring it, for the peace and comfort of certain individuals, and for the benefit and advantage of ALL. The mode is easy, simple, and perfectly within the reach of the titheholder and the farmer ; the consent of *both* is only wanting to accomplish the matter, and it is most certainly their joint interest not to disagree. One fact confirmed by experience and the test of years is worth a thousand empty speculations ; on this ground I have presumed to state, how my tithes have been collected and paid, with much satisfaction to all parties concerned in this tax on the produce of our land.

The churchwarden brings me a moiety of the rent of my tithes every Lady and Michaelmas day. The rent of the whole parish is levied on my parishioners by a *Tithe-Rate* made at a public vestry, and

sanctioned by their universal consent. I have left the whole regulation, as to the annual quantum of value, wholly to themselves: but in other cases it may be ascertained by a regular survey, or at a valuation *to be levied in money*, according to the variation of the market price; and when I have proposed a rise according to circumstances, they have always voluntarily regulated the rate, and invariably set the real value of my living to the *times* price. I ascribe much facility in this simple arrangement by honourably and confidently leaving the *whole matter of arrangement entirely to themselves*. I believe much is gained, and little lost, by confiding in the generality of men, and treating them openly and liberally in all our arrangements. My parishioners have never failed to give me, half-yearly, through the medium of a *tithe-rate*, originally formed by a vestry, and collected by the churchwarden, as I have mentioned before, the **REAL** value of my living; which perhaps I never could have procured by taking my tithes *in kind*, or any other usually harassing proceeding.

Treat mankind *liberally* and *fairly*, as the wise farmer should his mother earth, and I believe in all situations, and in most circumstances, both will most readily and proportionably make you very ample returns of gratitude and thanks. But in the case of tithes, especially when taken *in kind*, which are then truly irritating and vexatious, it is always

to be recommended, for the sake of peace, good neighbourhood, and particularly for the welfare of agriculture, that a *composition in money*, if possibly it can be done, should in some shape or another be constantly received by the levy of a *rate*; and in a course of years, by this means the titheholder is sure of getting the *POSITIVE* value of his estate, more than he ever will do by taking the tenth sheaf, and incurring all the trouble and the heavy expences of collection. Where a clergyman will rely on the good faith and *honour* of his parishioners, much comfort will inevitably be experienced by *both* parties in mutual accommodations; and if one farmer out of fifty should dissent from his brethren in forming a rate on his property, the dispute is between himself and his neighbours, who usually have the best means of bringing the man to his sense of duty, till he complies with what is fair and just in proportion with themselves. At any rate the litigation is among the farmers themselves, and not with the clergyman; and they are generally too wise and cautious to permit their misunderstandings to lead them into very great difficulties, or go to extreme lengths. But if these difficulties arise between the clergy and the farmer, they are too often carried to the bitterest extremes; hatred and malice ensues between those where peace should dwell; the old church is forsaken; the lands are neglected in their proper course of culture; and

eventually much loss is suffered by the individuals themselves, and the public at large.

If these principles, on which I have for so many years received the value of my tithes, without any difficulty or dispute, are worthy the attention of your Honourable Society; it would be necessary to state the outline of a bill founded on these principles, if ever, in the opinion of your united wisdom, it should merit the notice of Parliament.

Suppose a living to be 500*l.* per annum, ascertained by a survey, or any other mode of valuation, to meet the fluctuating price of grain, let the average of the *gazetted* prices for every year fix the quantum to be paid in lieu of tithes. The churchwardens should then be authorised to levy, by a half-yearly rate, the moiety of the living, 250*l.* on the occupiers of all lands within the parish; but always regulating the tithe-rate on the average of the *gazetted* prices. The churchwarden must be armed with similar powers as the collectors of the *poor-rate* or *land-tax*, and themselves must be subject to certain penalties in default of not paying the titheholder, twenty days after Michaelmas and Lady-day, a moiety of the *tithe* so regulated as above mentioned. Vestries may be called to aid the churchwardens in their duty; and in case of any dispute, the Petty or Quarter-Sessions, as in the appeal of the *poor-rate*, shall have full authority to determine. A responsibility must be attached to some

person to levy the rate, and pay the titheholder at a certain time ; and none so proper as the churchwardens, who are more immediately connected with the affairs of their respective churches. No provision is made for the churchwardens to compensate them for their labour, because they are naturally landholders, and the advantage accruing to them and their fellow-parishioners from such a regulation, must be considered as sufficient and ample amends. The land and property tax, as is usual, to be paid by the owners ; all other taxes by occupiers of the tithes.

I cannot conceive, that if such a plain, simple regulation was to pass into a law immediately, how any titheholder could object to it, that wishes well to himself and to his country. The rise and fall of the value of his tithe is provided for by *the rise and fall of grain*. His income is brought to him without trouble or the slightest vexation ; and the unpleasantness of making so many bargains with as many individuals, and taking the *crops in kind*, which is still more irksome to all parties, would be completely done away.

Those who are and have been acquainted with the nature of tithes, are fully sensible of the innumerable advantages that would naturally attend such a proceeding ; but it is too much to hope, in this imperfect state of things, that a *general* measure of this kind will be adopted, even by those who wish it, and have it in their power, if they had the mind

and resolution *to do it*, without it is enforced by legislative authority.

I have known, and I now know, many gentlemen impropiators, as well as clergy, inclined to follow this mode of commutation; but when it came to the point, some frivolous objections have been started *in limine*, which were of no real consequence compared with the object in view. Indeed I have been occasionally referred to, where I have seen the parties afraid to *confide* or *trust* each other in the supposed valuation of tithes, before it has been thought proper to submit the same to the opinion of a vestry. Where this is the case, the prospect of mutual accommodation instantly vanishes; and the parties, angry and dissatisfied with each other, return to their several occupations; but studying and contriving how they shall, in their course of cropping, harass, tease, and torment each other. I have been unfortunate to know some few instances of unbending prejudice and infatuated bigotry, that neither reason or persuasion, the sense of loss or the hopes of gain, could bring to any sort of accommodation with regard to tithes; but as consummate perverseness and inveterate obstinacy ultimately punish themselves, you usually see such people involved in perpetual litigation, and the scene concludes in beggary and wretchedness. Yet the misfortune ends not in the misery of the individual alone, who has brought himself into this

situation by his own misconduct, and therefore deserves but little compassion. The mischief extends much further ; the public feel and partake in the sufferings of the obstinate, as much as the tithe owner ; as much, indeed, and in that proportion, as he has wilfully neglected and maliciously refused to cultivate his lands in the true and proper spirit of good husbandry. Very few have taken any pains to investigate the nature of tithes, and examine deeply into all its bearings, as they affect the real interests of our national agriculture ; therefore *that commutation* may be considered undeniably the best, which is the least complicated, and definable to the lowest capacities ; and as such, easily understood by all classes of the people ; which will lead all to a better understanding of the subject of tithe, and may be the most promising means of producing more corn, and less injury to the community.

Thousand of acres have been laid down to grass, not with respect to profit only, but with a view of depriving the titheholder of his tithe ; it requires but few arguments to convince us that this system is very injurious to the public, as corn is wanted, and not *meat* ; the great body of the people are the consumers of *corn*, and must be fed at any rate ; and what is absolutely necessary for this purpose, and is not grown in our own country, must be imported from others. The growth of bread-corn in particular is a concern of the highest moment, and it is much to

be lamented, that any petty, selfish considerations should impede our exertions. An Englishman who sets a proper value on the soil of his country, and the land he lives in, which has produced and maintains him, will possess patriotism and prudence enough to cultivate every inch of ground he may fortunately occupy; he will not bend from the main point he constantly has in view of any intended improvements, on account of any narrow prejudices, but will serve his country, as he will naturally serve and enrich himself, by his honour, fidelity, and zeal.

If an increase of bread be thought necessary for our increasing population; a decrease of wisdom, policy, and prudence will not be found the best requisite to meet the perilous state of the times, or to extricate us from the many difficulties that surround us; and we must necessarily come to this conclusion at last, that those who *have the power, and not the will, of being instrumental in raising millions of quarters of grain, where none grew before, cannot be considered as alive to the vital interests of their country.* Any exhortation from an humble individual like myself may be deemed intrusive in exciting this ardour and emulation among my countrymen; but I confess *I* am not indifferent to our situation. We all owe *much* to our Constitution, and not less to the soil of our country; and *both* possess such blessings, as can make a people

happy, if we fairly use them : to become tributary, then, to other nations, for the very essentials of life, which with due care our own soil would produce, unfortunately proves that we have some weighty impediments which depress our exertions, or that we are truly insensible of the nature of the advantage which England might enjoy. We have every thing necessary for our independence completely within ourselves,—strength, situation, power, capacity ; nothing seems wanting, but a proper spirit and inclination to see things as they really are, and might be turned to our inconceivable advantage. Is it sloth ? is it *apathy*, indeed, which suffers us to want amidst such immense opportunities and resources ? Let us rouse ourselves to exertion ; Englishmen are now a-days strangely lost to all sober and serious reflection, if they think themselves deficient in any moral or intellectual means and power of accomplishing any object which their will or resolution may prompt them to undertake.

In considering any matter of extreme difficulty, as *the commutation of tithes* appear to be in the opinion of many, we should examine every part of its principles distinctly and impartially ; and by placing them in every point of view that their nature will afford, we may fairly judge of their real effects and consequences, so as to obtain at last what we should only aim at, *simplicity and truth*. Pursuing our researches in this unbiassed and honourable way, we

are more likely to make many valuable discoveries for the benefit of the human race, not merely for the comforts of the *present* day, but extending to *future* ages. By this means, our views of nature and of agriculture have been enlarged, and are daily improving. By this means, the imperfections of the most ancient systems of man have been altered from time to time, and progressively amended; and in such changes, the pressure of existing evils have been materially lessened or completely removed, and contributed most essentially to the happiness of human life. How much more then is this enquiry, in which the vital interests of this kingdom are deeply involved, worthy of all attention? Perhaps there is not at this *moment* any greater national subject entitled to more consideration than a better arrangement in the present system of tithe. The extinction of tithe seems on every account to be perfectly out of the question, even by the most zealous advocates for some reformation. Some sort of provision for the clergy has been nationally established in those countries, where all things have been confounded; in the midst of their convulsions, the support of a church establishment has not been neglected. The great desideratum is manifestly this, and, I believe, no man would desire more,—than that the pressure of tithe might be lightened by some gradual change or moderate *commutation*, which may not in any way, shake or tend to

the present fabrick of the church or state. Both are so cordially interwoven, we know, that if the rights of the *one* are completely subverted by any violent or intemperate measures, the *other* must consequently fall. Every generous man will give to every man his due ; but when these, in process of time or by change of circumstances, become the greatest obstacles to the general good of the community, some fair means may be devised, without invading a right, either between the parties themselves or by the legislature, to soften the rigour of the demand, and to supply, in case of any positive exchange, a full, fair, and ample compensation. But after all, if from motives of delicacy, Government should decline any interference in these antient rights of the church, much may be done by the parties themselves in their respective parishes, if they value peace and good neighbourhood, and superior husbandry, as much as all men should, above the paltry consideration of a few pounds, usually acquired to the *injury of both parties*, with much strife and perpetual contention.

Parliament could not do any more for the people, than the people, if disposed to accommodate each other, can do for themselves ; after all the schemes, good and bad, that have been recommended to their attention, a total abolition or extinction of tithe is the last measure we have any reason to expect from their wisdom, prudence, and moderation. The Senate can only say to those who fastidiously reject

every plan of commutation, and at the same time who pray for their mediation and interference,
 “ Return to your employment ; cultivate your soil
 “ with energy and zeal ;—**BE LESS AVARICIOUS ;**—
 “ be content with a moderate gain, for in striving
 “ to get *more*, you are in great danger of losing *all*.
 “ Adjust all differences between yourselves ; where
 “ we cannot interpose ; you have the means within
 “ your *own* power, which are not always in *ours* ;
 “ follow the example of those who have the mind
 “ and the true spirit of mutual accommodation in all
 “ things. Pursue these plain maxims with manli-
 “ ness, and **WITHOUT GREEDINESS OF LUCRE ;**
 “ and the hardship you complain of will ever be
 “ within your *own* power to correct.”

I have fancied the above words to be the language of Parliament in all applications made to them on the subject of tithe ; how far they would be **WELL** said on this great point, and founded on indisputable facts, I humbly leave to the judgment of those who are at this time living in repose, and enjoying the benefits of such reflections and accommodations. In every parish where the parties are ill-disposed towards each other, no power on earth can prevent their cavilling on straws ; and where tithes are taken in *kind*, especially, a dreadful field of rancour and malice is opened for the faculties of the human mind to expand ; and a right is too often converted into a most grievous and tyrannous oppression. In

these miserable cases, can Parliament either change the disposition of the contending parties, or put a better heart into the breast of the titheholder or farmer? These changes are wholly with *themselves*; and if they are too obstinate to submit to a corn-rent, money-compoition, or an equal *tithe-rate*, on the property of their fellow-parishioners; they must be content to yield to something worse, that is, tithe taken in kind, which is making the claim in all cases most indisputably *doubly oppressive*. If the legislature were to bend their whole attention to the subject of tithes, in the opinion of many who have considered most usual bearings, as a tax on the produce of the soil, and put it in every point of view for the real advantage of the titheholder, the agriculturist, and the kingdom; no possible plan or scheme can be so universally adopted, with less injurious effects, and more substantial good to all parties, than a *tithe-rate*, in some such form as recommended in the foregoing pages.

It would be needless for me to repeat the individual comforts I have experienced under this particular mode of *commutation*; and, I hope, my parishioners have every reason to say the same. We have journeyed in the vale of life many years together, without any interruption in our agricultural pursuits; and it shall not be *my* fault, if this mutual harmony does not continue to our journey's end. It may be observed, that a clergyman, to obtain this quiet and

repose, must be in easy circumstances, or may over-
 value his comforts at the price of a great part of his
 estate, may court popularity at the expense of his
 purse, or may absurdly sacrifice some part of his
 income to the *injury* of his family and the *good* of
 his parishioners. With regard to myself, I can only
 say, I hope I am not so unjust to my *own*, to be ac-
 cused of the former ; and certainly I confess I am
 not rich enough in the good things of this world,
 as to be so indulgent in the latter ; and whatever
 value I put on the esteem and friendship of all my
 neighbours, however good is by far preferable to
 ill will, still these blessings are not to be purchased at
 too great a price. I am convinced my income in
 tithe is more regularly paid, without the least trouble ;
 and that that income is by far more than I could by
 any method contrive to make it by any other mode
 of composition. Every man rents his own, as regu-
 lated by the rate among themselves ; he ploughs,
 sows, and reaps, as he *pleases* ; he pays his quota of
 the *poor-rate*, in proportion to the tithe he occupies ;
 and my only deduction is my share of the *land* and
 property tax, paid by the churchwarden half-yearly,
 when he brings me the moiety of my rent. Com-
 pare this plain system of adjustment between man
 and man with any in existence—what are the results ?
 In a moral point of view, the fruits of the gospel—
 peace and good-will to man ; and harmony, where it
 ought to be found in every parish, between a

clergyman and his flock. Let us only contrast this beautiful picture with that sad variety of oppression for ever attending taking tithes *in kind*; a direct warfare between man and man irritating the tempers, and perverting the labours of the parish, a contracted husbandry, and a miserable product. In a *political* point of view, how a nation may be injured or improved by a comparative estimate of these representations, are too well known by the considerate and thinking part of the world to need my further illustration.

Those people who wish so ardently for a substitution for tithe, may find it in these pages; but they cannot expect much relief from their difficulties, unless they have the courage and prudence to apply the remedies prescribed; deep-rooted prejudices must first be discarded; much self-interest, many petty considerations laid aside, and a generous and *open conduct mutually adopted*. In fact, is not this the best principle of action in all our concerns with each other? *It is less irksome, and more rational and manly*, always less injurious to ourselves, and certainly in the end most beneficial to *all*. In short, our days are too contracted, and often too cloudy, in the opinion of the *wise*, to waste them in the endless pursuit of wealth, anxiety, and trouble.

There are others who talk most wildly on the subject of tithes, who are too indolent to examine their nature or their origin; but too ready to listen

most implicitly to those who are biaſſed in their opinions by prejudice only, and raſhly condemn a ſyſtem which they deny themſelves the trouble and pains thoroughly to comprehend ; theſe miſguided people are harmleſs,

“ Paſſimque tela innocua jaſtant,”

compared with *others* who are pregnant with miſchief and deep in deſign, if they poſſeſſed the power, of deſtroying, at one ſtroke, not only the whole ſyſtem of tithes, dues, and antient cuſtoms, but our venerable Eſtabliſhment altogether. Next comes the deluded *fiery zealot*, with a bible in one hand and a ſword in the other ; this man has recourſe to ſynods and councils of the fathers, and builds his right to tithes on *jure divino* of the Jewiſh Theocracy, which no human power can have authority to *commute* or limit. He founds *his* immutable claims on the chapters of Leviticus ; which, in my *humble* opinion, in this reſpect *only* controuled *the Jewiſh prieſthood*. It would extend this treatiſe far beyond the bounds of moderation, if I were induced to enter into any arguments to convince theſe ſeveral people, whom I preſume, with ſome deference, to think completely miſguided and radically wrong. But I will only quote theſe emphatical words of *Irenæus*, which they may apply as they pleaſe : ſpeaking of the tithes paid to the prieſts of the Jews, he ſays, “ We Chriſtians ought not to give *leſs*, becauſe we have the *greater* hope.”

It cannot be expected that we should all think alike on the same subject; different ideas may provoke discussion, and this, to have its proper effect, should be always conducted with moderation. Intemperate observation on any subject irritates, rather than convinces; and from this circumstance alone, the real nature of tithes has been much misrepresented, and consequently misunderstood by people in general. Temperate discussion would have ultimately informed us all, that tithes *may be commuted*, and have been *limited*; that some plan, thoroughly matured by the wisdom of able and enlightened men, might tend in some measure to lessen the evils we complain of; that, on due reflection, some simple scheme, not unlike the one I have presumed to recommend to the notice of your honourable Society, would in some measure answer the end proposed, of giving new life and spirit to husbandry, until a much better can be discovered.

If we refer to certain Acts of Parliament for the encouragement of agriculture, and which, I am sorry to say, are very *few* indeed, we shall find a particular one for the cultivation of *madder*, (the 31st Geo. II. c. 12.) It enacts that every person shall annually pay the sum of *five* shillings and *no more* for every acre of madder. I believe this statute expired, and that madder is now tithable in kind. But it may be asked, why any restrictive clauses with regard to the tithe of madder were enforced

by the Legislature? Because it was thought sound policy to encourage in England the growth of this valuable plant, which at that time only grew in the United Provinces ; in these countries it was exempt from tithe, and the farmers enjoyed a monopoly. To destroy this monopoly against Europe, to introduce its culture here, and to give all possible encouragement to its growth *at home*, Parliament interfered, and *limited* the payment of its tithe.

This circumstance is now mentioned to shew us this substantial proof, far beyond any cavil or contradiction, that the Legislature has *controlled*, has *limited*, the mode and quantum of tithe in one case, where it was considered as most essential to the welfare of this country; which may satisfy us that the same authority still exists to limit, *commute*, and arrange the same salutary measures in all cases, for the same beneficial purposes. In the case of *madder*, where the planter was to be at a large expense, and the tithingman at none, the profit of the tithe was considered too much, and therefore was legally confined within certain limitations ; affording a just tribute to both, under some risk and speculation. This may apply to some other products of the soil in some parts of the empire, and has materially discouraged many improvements by the landlord, as well as much cultivation by the tenant. Tithes in *kind* are very heavy and unequal in some cases, and in particular crops requiring very expensive preparation ; where

these circumstances occur, it may not be too unreasonable to expect some abatement in the tithingman's demand, which, if too rigidly enforced, must amount in many instances to a total prohibition of culture. Again, as to quality of soil, rich lands may sometimes pay a tithe of *five* shillings in the pound, poor lands that of *ten*; this difference arising principally from the mode and costs of cultivation. Poor lands must still remain so to some extent, unless proportionable encouragements or abatements are afforded to assist their sterility and weakness. Though the produce of rich land may pay a greater proportion of tithe than the poor, still the occupier of the *former* can never be so injured or oppressed in his exertions, as the occupier of the *latter*. This difference is too often exemplified in various districts of the kingdom, where a negligent farmer with moderate exertions will thrive on a *good* soil, whilst a most intelligent and active one, with every possible exertion in his power, will scarcely maintain himself and family above penury and want. It however is always to be regretted in every point of view when this happens; as the industrious man, disappointed in his fair returns, moves our pity and compassion; so the idle and inattentive, surrounded with every advantage, which he disregards or misapplies, deserves, as an useless member, our disapprobation and contempt. Every man's capital should make ~~his~~ fair interest in any employ, especially in that of agri-

culture, by all due encouragement : in any country where this does not happen, no future increase of product can be expected to reward the talent of the speculative, or the labours of the farmer, both which ultimately augment the revenue and wealth of the country.

Mr. Locke has said, " all government is instituted for the *good*, not of particular individuals, " but the *whole* community over which it rules." If this be the object and end of government, then such alterations may certainly be introduced into its form and constitution, as are consistent with that object, that end, and the public interest ; but most fully compensating those who have contributed in any ways to the public accommodation.

I have used this quotation from such an authority, that I think no reasonable person will venture to oppose or contradict it ; even those who are, unfortunately for themselves and their country, the bitterest enemies against all *commutation* with regard to tithes, if they would condescend to subscribe to this opinion, the position would then be admitted, that Parliament would have a positive power of legalizing at least a *tithe-rate* throughout the kingdom, if they were inclined on any emergency to use it. This measure alone, without going to any legislative extremes, would, in the opinion of many, be thought sufficient to prevent tithes being taken in *kind* ; and I must again repeat it, where the welfare of *all* is so deeply concerned, that if the plan, by which myself

and a few others have received, in common with our respective neighbours in the employ of agriculture, for many years, such advantages, could be adopted *universally*; immense improvements, not only in the management of the soil, but in the arts and sciences, all which are intimately connected with agriculture, would *immediately* increase, to an inconceivable amount, the product of the united kingdom. When we estimate fairly the annual produce of ten thousand parishes, of which England consists, unshackled and unrestrained in their course of cropping the ground, and a full freedom afforded to every branch of excellent husbandry; it would in a few years amount, on the best calculations which have been made, to three times the quantity we at present obtain. Those objectors who may be too jealous of the least interference of Parliament with respect to the *commutation* of tithes, if disposed to examine, may turn their attention to the acts of the senate, which have lately controlled every species of *private property* and *ancient rights* in the formation of docks, roads, and canals. Why *tithes* are to be exempted from any Parliamentary arrangement, and on which perhaps the greater use of these very docks, roads, and canals, as producing a less or greater commerce to employ them, may eventually depend, seems to be a complete mystery that wants explanation. If proper remedies can be applied to meet the disease, and are attainable *within* ourselves

without any legislative interposition, all the better ; if *not*, the consideration alone of importing as much grain for our necessary supplies, as costs us seven or eight millions of *bullion* annually, is so alarming a concern as to almost justify any Parliamentary interference. It would not be fair, however, to impute all the delay in the inclosure of our wastes, which would supply our deficiencies, to *time* only ; the great charges, and other circumstances attending inclosure bills have their full share in checking the intended improvements of the country. The interests of commerce have hitherto been so encouraged in this kingdom as the sole source of our wealth and revenue, that they have swept before them every other consideration. The interests of agriculture have been of *secondary* moment only ; they have been and are *now* kept down and depressed below their fair level, by an imprudent import of corn and wool. But I think, with submission, the times are coming, when our necessities will convince the politician, that encouragements due to our own soil shall be esteemed the *first*. When commerce and manufactures are limited or crippled by any continental regulations, as at *present*, capital is thrown out of its usual chanel, and is naturally invested in land ; it is much to be regretted, then, that it finds almost as many impediments in the culture of the soil, as it did in the commercial engagements from which it was originally taken,

There is scarcely an evil happens without an eventual good. The mercantile difficulties have shortened the import of grain and wool ; and the capital which enlarged the importation of both these articles, to the injury of the British farmer, is in some measure directed in raising these at home, and where *only* they ought to be produced. It is not only unjust, but a miserably unfortunate defect in our policy, not to find these things at *home* in quantities sufficient indeed to feed us, and employ our manufactories, without depending on *foreign* supplies. Pressed as we are on every side by taxation, the very *contrary* ought to be our situation ; we should now raise a *supply* to *export*, to enable us to stand the pressure of the times, rather than *import* to a certain loss and ultimate destruction. Thus we see the field of agriculture becomes a source of refuge to the merchant in his distress ; and as he individually feels the value of the plough, he unavoidably adds to the public exigency. Thus we know again how absurd it is to value the interests of commerce above those of agriculture ; when *both* are to succeed, the wisest policy is to give them *both* that due and equal weight, which they respectively may deserve. Since then it appears we have such excellent means within *ourselves*, it is to be wished that those who have the power, may possess the talent also to give a just and impartial direction to our resources of every description ; may have the

spirit, promptness, and energy, to stimulate, to encourage every exertion in the people; to afford those great opportunities their exalted stations give them, indiscriminately, impartially to *all*, who either have, or are inclined, by their unremitting zeal, in any great improvements in the arts, in the sciences, particularly those of agriculture, which under many imprudent restraints and discouraging difficulties, have elevated this empire; and will still more so, especially if a perfect freedom of action, if fair and due encouragement were allowed to all her reasonable undertakings, which common prudence should not deny, or improvidence depress, shall elevate her unrivalled above all the nations of Europe. Perhaps this beautiful maxim may well apply to statesmen as well as to every private man,

“Nullum numen abest, si sit prudentia.”—*Juv.*

Under these impressions of *prudence* alone, which is in fact the sum of all politics, the landed interest have many weighty reasons to hope for, to expect every possible encouragement that can be given to put our *own* markets at least on a level with the *foreign*, which is very far from the case at present; while goodness of soil, with inferior management and miserable culture; while indeed but little pains and trouble, and less manure or assistance, are bestowed on our lands; how can we expect them to yield otherwise than they do? If England be worth cultivating at all, surely it is capable of yielding a

produce infinitely beyond what we are receiving at present. Our matchless Constitution secures to us every comfort and blessing that our situation and our own industry can give us, still these blessings are to be multiplied beyond our conception. If the *agriculture* of this fine country had fortunately met with the same encouragement as its *commerce*, we should not have to lament that at this moment our domestic supplies are inadequate to the wants of the people. As we are gradually acquiring more light on these matters by dear-bought experience, we in *future*, no doubt, shall see both upheld by every legislative provision, by most vigorous support, which the *one* is certainly entitled to as well as the *other*; and when this is effected as it ought to be, both will, *pari passu*, lead to that perfection in which we hope to see them.

There seems to be much difficulty in the opinions of many with regard to *moduses*, which neither rise or fall with the rent of lands; which to be considered sound, must be a real composition, which tallies with the value of tithes in kind, at the æra of Richard the Third. Now as a *modus* is an annual payment of a small rent in lieu of tithes, it cannot in any way be supposed to retard the progress of agriculture, but encourages rather than discourages its operations, on a principle of doing a good rather than an injury to the state, there cannot be even the shadow of a reason to disturb them. *Moduses*

are of many kinds throughout the kingdom, and usually are in *favour* of husbandry ; and if they were *not*, I see no just reason why even the *antiquity* of these should screen them from any specific change which may benefit *all*. It is necessary to convince the most scrupulous on this point, that *real* necessity has no law to restrain it ; and this *rigida necessitas* is now discarding original right, in many instances, for public advantage, and taking from every Englishman's purse the *tenth* of his estates—and for what? for the supply of the state: and why not, on the same principle of the public exigency and welfare, alter, amend, and reasonably change the effects of those *tenths* called *tithes*, if it be absolutely expedient, at this awful crisis? The great national prosperity must suffer in proportion with the individual, under any improvident system of restraint: the landlord, the tenant, the public, and even the titheholder himself in his *tenth*, as that must partake of the quality and quantity of the *nine* parts, which never can be expected to be so productive under a restrictive as from a free and liberal course of husbandry. The accounts that we have from those parishes where tithes *in kind* have ceased, under the arrangements of new inclosure bills, confirm most fully and uniformly the results of such a beneficial change. There is a species of tithe called *agistment*, which is the tenth of the food consumed by the mouth of the animal ; the payment of this has occupied more questions in the

Court of Exchequer than any matter connected with it; though the right and the mode of payment have been thoroughly investigated, explained, and fixed upon general and incontrovertible principles, still it is the source of endless cavil and of much expensive litigation. The nice calculations in point of time, quality of food, and number of stock, particularly with regard to sheep, that have so depastured, are an infinite source of disputes between the titheholder and his tenant; but in any parish where a *tithe-rate* is approved of, these perplexing calculations are completely done away, as well as a thousand disagreeable consequences, provoking animosity, and constantly irritating the passionate feelings of men, by no means the least of which is, in the opinion of the prudent, an expensive, and too often, a fruitless litigation. In two parishes where the right of agistment was litigated, the proctors' and attorneys' bills amounted to three thousand two hundred pounds! This fact alone may convince us how prejudicial this species of tithe is, not only to the peace, but to the purse of the contending parties. In parishes where it has been rigidly demanded, we are not surprised that the person who is to pay, and the person who is to receive, such tithe, should be equally led into embarrassing circumstances. The farmer, who is bound to keep the account, and give it annually to the tithingman, is at all times subject to a dreadful inconvenience; besides many objections may

be urged by either in making out and adjusting such an account, as to the time, manner, and sum due for each animal, which has been agifted. This tedious and disagreeable trouble to both would instantly be obviated by the adoption of a *tiths-rate* or a private composition ; but if the parties are so much their *own* enemies, as to persist in demanding their agiftments in kind, that is, so much per head as agifted, and will reject all mutual accommodation under such a prudent arrangement, there is a still less vexatious mode of shortening their calculations and ascertaining their value ; it is, after considering fairly the peculiar circumstances of the soil, nature of the stock fed, and the local situation of the parish, for the farmer to pay at all times, when he has the option of doing it, an annual average sum per acre for the lands he may occupy, instantly, without cavil or hesitation ; and on the same principle of mutual convenience and good neighbourhood, I recommend the tithingman as readily to receive it. There is an invariable rule to be observed in disputes of every nature—it is better to sacrifice a part of our rights, than, by pursuing them too obstinately and tenaciously, to endanger the public and private peace. Men of prudence and liberality usually yield with dignity and candour, without the intervention of the law. In confirmation of this doctrine, I hope I shall not be considered as too partially vindicating my brethren of the church, when I say that in

most disputes with regard to tithes of all descriptions, where all proposals of accommodation have been contemptuously rejected as extravagant, unfair, and even illegal, and they have been *compelled* by the imperious and unreasonable conduct of their opponents, to claim the protection of their country, at a great individual expense, they have nine times out of ten prevailed against their adversaries, and fully established their disputed claims. I have not arrogantly or inconsiderately made this observation, which may be amply confirmed by the existing records of the Courts of Chancery and the Exchequer, to elevate my brethren above their real and merited deserts; but with the honest and manly view, and I say most avowedly so, with all my humble talent, to screen, to defend them from that indiscriminate obloquy and severe reproach which has ever, more or less, been unjustly and illiberally cast on their order.

This treatise has been carried imperceptibly to a great length; but when the motive is justly considered, that it is written with a view to obviate entirely, if not with some hopes of moderating at least many and great evils in our establishment, civil, political, and ecclesiastical, the motive may have its due regard. The same good intention which induced your honourable Society publicly to institute this serious inquiry with regard to the whole system of *tithes*, has incited me to offer this humble tribute to my country and your valuable protection;

“Nescio quâ *notale* solum dulcedine captos ducit,” is a sentence by no means inapplicable to your patriotic exertions to inspire other societies with a similar ardour. All orders of men, following your example, are *now* called on to assist their country by every expedient that can be wisely used, to increase the revenues of the state, and the natural resources of the nation, to remove all embarrassments which virtually destroy the spirit of improvement, the spirit also of friendship, union, and benevolence, which dispositions in all ranks of the people are of such happy and vital consequences to us in our *present* situation.

To this end and design have the whole aim and attention of the writer been sincerely directed ; and how far his measures proposed *have* been and are likely to be successful, is left with much respect and the greatest deference to the candid and superior judgment of your honourable Society in *particular*, and to the fair and just opinion of the world in *general* ; only claiming those indulgencies which the great difficulties of the subject may naturally lead every man to expect. The writer of this treatise flatters himself that his labours in so laudable an attempt have not altogether failed of success ; as many instances already prove, that the means recommended of alleviating the burthen of tithes have been truly serviceable and eminently beneficial to the clergy themselves, as well as the laity, and consequently

to the *great* interests of the kingdom. It is therefore his earnest hope and sincerest wish that they will be more so to the *present* and to succeeding ages. If the reasoning in these pages be generally admitted to be just, those who at this time insist on the *divine* right of tithes, founded either on the law of Moses, or confirmed by the later charter of Ethelwulph in the year 854, should be induced fairly to examine the mutability of things from age to age, and the absolute necessity of adopting certain expedients, answerable to these changes in the affairs of men: original errors are continued by *precedent* only, and there are seldom hopes of any redress, if no exertion of our reason is allowable in the amendment of the most obvious defects. If by such investigation, impartially exercised, the present situation of our country may daily appear to be improved by a gradual or immediate commutation, or indeed an extinction altogether of tithes, which may be more convenient to some, but never can be just to all without an *honourable* and *fair* equivalent; if the absolute pressing exigencies of the state require, at this time, such a beneficial change: we may then be allowed to hope at least, if we are directed by reason, which is our best guide, and not by precedent which alters not, that every man who wishes his native land to emulate, if not to surpass, the other powers of Europe, in arts and arms, in every science that

adds to the comfort of the people, will most readily resign that antiquated maxim which has prevailed for so many ages, of “*Nullum tempus occurrit talibus ordinationibus*,” to the more enlightened and liberal policy of the present day. The prerogatives of kings, like the privileges of subjects, are only established for wise, good, and salutary ends ; whenever these shall so operate as to produce such effects as are injurious in a great degree to the welfare of the people, we need not be very scrupulous in saying, that some change and commutation for the general good is absolutely necessary. “They must often change,” says a great man, “who would be constant in happiness and wisdom, according to the time and necessity of the state.” The Prince, who so honourably patronizes your society, the Peers, the Prelates, and Commoners, all animated with the same patriotic views, in seeing among all classes of the people in the united kingdom, truth, peace, and prosperity, are now more particularly called on by your urgent recommendation, as well as by that of others, to improve by some means, and afford some seasonable relief to the great object that is now before us, which may appear, in every point of view, moral, political, and religious, the best calculated to promote the interests of agriculture, the welfare of the church and state, and which, in all its effects, duly appreciated

by every Englishman, must eventually uphold our
NATIONAL GLORY.

"Vive, vale : si quid novisti rectius istis,
"Candidus imperti ; si non, his utere mecum."—HOR.

Sopley, Oct. 27th, 1813.

JAMES WILLIS.

ARTICLE XVII.

Hints on Planting.

[Communicated by Sir R. C. HOARE, Bart.]

WHILST, at a period when the population of Great-Britain has been ascertained to be rapidly increasing, and the produce of grain found inadequate to the consumption of its inhabitants, the attention of land-owners has been very justly directed towards the cultivation of our waste lands with Corn ; yet there are instances where that attention might be more advantageously directed towards the growth of Timber. And as, from the experience of last year, I am enabled to prove this assertion, I think it my duty, as a member of the Bath Society, to lay before it the following correct statement,

In the autumn of the year 1813, I cut down a grove of fir-trees, which, from the decayed state of their upper branches, seemed to indicate a full growth and maturity. They had been planted by order of my predecessor at Stourhead, Henry Hoare, esq; about the year 1758, and upon so very shallow a soil, that the roots, in order to procure the necessary nourishment, were forced to extend themselves along the surface: in short, the soil was of so poor a nature, that it could not have been applied to any other purpose but to the growth of trees. The situation, however, was sheltered, and on that account well adapted to the fir tribe. Beech and other deciduous trees had been intermixed with them, but not in any great quantity; and no attention had been paid to this grove, either by thinning or pruning, since the day of its first plantation. The greater part of the firs were spruce, the remainder Scotch.

The number of trees cut down was ninety-two; and the space of ground on which they stood was three rood, or three-quarters of an acre. Their produce amounted to ninety ton of measured timber, which, at the low price of 4l. per ton, produced the sum of 360l. The largest tree measured in length sixty-three feet, and in girth fifteen feet and three-quarters, and contained one hundred and eight feet of timber. These trees, owing to a want of attention in trimming and selecting, varied very much in size, some not containing above eight feet

of timber. Yet with all these disadvantages of nature and art, this small and poor plot of ground, from the date of its first plantation in 1758, has, for the term of fifty-five years, paid at the rate of 8l. 14s. 6d. per acre, or 6l. 10s. 10d. per annum, for the three rood of land on which these ninety-two trees stood; and if proper attention had been given to this grove for a few years after its first plantation, and if it had been situated nearer to some great town, both the size of the timber, as well as the sale of it, would have been considerably increased. These trees grew in a plantation just beneath the building in my woods, called the Convent.

A general idea prevails that firs will grow anywhere, on any soil, or in any situation. I allow that they will grow, but not pay the planter interest for growing, in *exposed* situations: for though the soil cannot be too poor, if dry, for this tribe of plants, yet a certain degree of *shelter* is absolutely necessary. I have found the larch fir to be of a much hardier nature than the Scotch; it grows quicker, measures more in length when cut down, and is closer and harder in its texture. The spruce fir, though fine timber, requires more shelter than either the Scotch fir or larch.

In former days, a most injudicious mixture of trees was made in the extensive plantations of this neighbourhood, namely, beech and fir, by which union the luxuriant inclination of the former was totally

checked, and rendered as straight and formal a pole as its neighbour. The beech will not bear trimming, except when very young; and being the most unsaleable wood in our district, should be considered as a tree of ornament, not of profit; whereas the growth of fir trees is so rapid, as (making use of an old expression) to enable the proprietor to purchase a horse, before any other plantation would enable him to buy a saddle.

By the above statement, I do not wish to encourage the Land-owner to appropriate to the growth of Timber any soil that is equal to the continued growth of Corn, which in the increasing state of our population ought to be the primary object of attention. My sole object has been to shew what an advantageous profit may be made on land which has been rendered unfit by nature for the growth of corn.

RICHARD COLT HOARE,

Stourhead, 1813.

ARTICLE XVI.

A MISCELLANEOUS

Essay on Vegetation and Tillage,

And many Defects still seen in our general Practice;

Accompanied with a Description of a Plough for a new Mode of Culture; and of a Land-Roller, more effectual, it is believed, than any in use, for the more equal Compression of an uneven Surface.

*To the Members of the Bath and West of England
Agricultural Society.*

GENTLEMEN,

NOT less from inclination than your particular request, I have the honour to lay before you nearly a completion of a series of Agricultural Machinery, calculated for present systems of practice, and being equally adapted for others of superior science, more efficient, it is hoped, than the implements hitherto generally employed.

Having given, (though subsequent in application,) in the tenth volume of the Society's Papers, some

account, with explanatory drawings, of large and small Harrows; and in their twelfth, of that important implement the Plough, together with some instances of the superior powers of the latter; what I have now with deference to offer for your inspection, considered as a continuation of the series, may be properly attended with a few preliminary observations.

In the outset, however, of an Essay upon Vegetation, and an account of new Machines, the attention is unavoidably called to our still-continued want of an appropriate field for trying their merits, and ascertaining the nature and properties of those plants and vegetables newly discovered or introduced, and the different modes of cultivating, treating, and applying them; as without it, whatever of either may be most valuable is equally liable to pass to oblivion with others, of every degree of inferiority and insignificance.

And here I beg leave to observe, that nearly the whole of the above series of machinery was exhibited at the Society's rooms, at their annual meeting in 1805; while other parts are yet to be seen in its repository, viz. a hook for cutting beans, being part of an entirely new apparatus for an improved culture and harvesting of that grain, and superior to any thing of the kind the writer has elsewhere seen or heard of: other parts of the apparatus were however sent, some years since, into the country, to preserve them from destruction.

There is also yet to be seen the share of the original or first Mole Plough (more properly a Terebra) for draining ; and which was in use twelve or fourteen years before others (for which, though very inferior to the original, three or four patents have since been obtained) were ever seen. Of this the writer may have occasion, in the following pages, to give some further account.

There is also a Pedometer, for land and road measuring ; by far superior, as acknowledged by all versed in such matters, and who have inspected it, to every thing of the kind hitherto seen or known.

A simplified Level, much wanted for manual operators in draining, irrigation, and for directions for proper ploughing, &c. &c. is also to be seen there, as the only effectual one, I believe, adapted to the *pockets* and *capacities* of those necessarily employed in those operations.

An instrument or machine is likewise seen there, the want of which, and whereof we have any account, has never in any age been yet fully appreciated, or the value justly estimated. From its property of measuring conjointly both time and force, although the latter will be constantly varying, it is believed a measure of resistance may, *with sufficient precision*, be obtained, as well as of that of the power employed, though necessarily equally varying, to overcome that resistance. Of this, too, more will be said hereafter.

An entire new mode found there of framing Timber for Roofs, and laying thin slates thereon, displayed in your tenth and eleventh volumes, and which, with some improvements, from intermediate experience,* may now be done at little more than half the expense of prior modes, (and with a fair prospect of tenfold duration,) has since been pirated from those volumes; and from elegant plates and descriptions of it given by the plagiarist, (although, to conceal the theft, not without some deterioration,) is now duly appreciated elsewhere, and practised in different parts of the kingdom.

It has been somewhere observed, that it is a hard and nice subject for an author to speak of his own productions; inasmuch as it is unpleasant to himself to say any thing of disparagement, and to the reader to hear any thing like commendation. I however hope that I may here, without ostentation on my

* These improvements (in conformity to the determined hostility of artificers, who necessarily have it always in their power to render ineffectual the cement before recommended) consist in giving the timbers an elevation of twenty-four degrees instead of twelve; and which, requiring only an eighteenth of greater length in the rafters, and consequently attended with very little additional expense, will still be found sufficiently depressed to be intercepted by a very low parapet wall. The rafters, instead of being only two feet apart, are now set at thirty inches one from another; and their sections, instead of four inches by two, those set on the wall-plates are now six by one only; while every third pair, footed in the beams, are six by two at their lower ends, and at their upper ditto four by two.—See section of twelve degrees, vol. xii. Society's Papers, p. 378, figure 10.

own part, or offence to others, appeal to the judgment and candid decision of the latter in support of a system of machinery calculated for a culture of our lands, wherein perhaps may be found something superior to what has been hitherto observed.

Frequently witnessing and ever conscious of the inadequacy of all modes hitherto employed for drawing forth, and, with necessary precision, deciding on the comparative merits of that basis of human weal, the Plough; the writer was, some years since, instigated to a public display and demonstration of the fact. The result, Gentlemen, he had the honour, by your suffrages, of having publicly recorded in the twelfth volume of your Papers; and for which he was further honoured by the Society with a munificent present in Plate: still, although no experiment of the kind, even throughout Europe, or any other quarter of the globe, stands on record in any degree equal to it, and incredible, and even repugnant to common sense, as it may to many appear, no further notice was any where within our own boundaries taken of it; although an increased foreign demand for similar ploughs has in consequence taken place.

An existing fact so notorious, publicly witnessed, and that could afterwards be suffered to slide so easily away, can probably be only exceeded by its not having any where excited even an enquiry into,

the cause;* and as it might appear invidious in the writer to allude at all to the *consistency of Societies*, now every where establishing themselves, for the *encouragement* of agriculture, he can only recommend the subject to their future discussions and determination.

“ Knowledge,” says a great and learned author, “ is indeed the foundation, the first principle, and, “ as it were, the parent of wisdom, *but it is not* “ *wisdom itself*. Wisdom builds upon knowledge a “ superstructure by so much the more noble and “ excellent, as beneficial practice is preferable to mere “ visionary and *inactive* speculation. Wisdom is “ knowledge digested, and applied to its *right use*,— “ to the contriving and producing order and good

* In Weld’s Tour to Killarney in Ireland, we have the following anecdote.—“ At a place called Reen, within Bantry Bay, the “ plough was absolutely unknown till the present clergyman introduced it. Immense crowds immediately flocked down from “ the neighbouring mountains to examine the novel instrument; “ and its operations were beheld with wonder. To those of his “ parishioners who were inclined to employ it in the cultivation of “ their ground, the proprietor readily offered to lend it; and “ numerous applications were in consequence made. Shortly, “ however, the plough ceased to be in request; even the sight of “ it appeared to be cautiously shunned. That an instrument productive of such an obvious and immediate saving of labour should “ be thus discarded seemed somewhat extraordinary; but to unravel the mystery was not difficult. The people had been reminded that their forefathers had *dug* the ground; that the “ plough was an *innovation*. An unanimous resolution was instantly “ made to follow the steps of their ancestors; every argument to “ the contrary proved ineffectual; and when we visited Reen, the “ ground still continued to be cultivated with the spade!”

“ upon the whole. There may be knowledge
 “ *without any design* ; but design is essentially in-
 “ cluded in the idea of wisdom. Wisdom consists
 “ first in the deliberate proposing the best and fittest
 “ end ; and secondly, of *the fixed choice and steady*
 “ *pursuit* of the most proper and *effectual means*,
 “ *in order to promote it.*”

Where a just application of the sentiments of authors of the first reputation happens to coincide with our ideas, it may probably be allowable, if not most eligible, to adopt them. And if Adam Smith's positions are to be relied on, that our political as well as animal support is to be derived only from our lands ; and that, in the end of things, their produce, and our exertions in cultivating them, alone constitute our real wealth ;* I fear, the exigencies of the times considered, the total *want of design* in the general costume of our agricultural concerns will be but too apparent. And here I would humbly appeal for information to any power I could deem capable of removing that general dereliction, from whence is seen to proceed the many and just causes of our complaints, whether, in a national or political point of view, a provision should be found in the code of British laws, whereby a renter of a thousand

* “ The unproductive class, that of merchants, artificers, and
 “ manufacturers, (says Adam Smith,) are maintained altogether at
 “ the expense of land proprietors and cultivators ; they furnish it
 “ both with the materials of its work, and with the fund of its
 “ subsistence.”

acres of land, and wherein, if in his power, he ought in duty to his family, his landlord, and his country, to invest at least five pounds an acre, with a view to profits at seven, fourteen, or twenty-one years end, and a cobbler, howsoever happy in his stall, should each of them be *equally* under a necessity of quitting his occupation at *six months* notice? Or if a tenant at will, conscious of a liability to be turned out at even *twelve* months end, and yet seen strenuously adhering to our most generally approved fix-field routine of cropping, and therein expending, with a view to remuneration at six years end, from five to ten pounds an acre to secure a crop of turnips, for instance, as its basis; whether such his strenuous adherence may not proceed from some trifling debility of mind, or imbecility of intellect? And whether, however well disposed, he may be afterwards most eligibly brought forward for eliciting improvement in the most abstruse of all sciences, and of therein ratifying the stability of his country's weal?

After consulting Judge Blackstone, who, speaking of even the first occupiers of the earth, asks, "Who would be at the pains of tilling it, if another might watch the opportunity to seize upon it and enjoy the product of his industry, art, and labour?" I would further humbly request to be informed, if sainfoin, the best of all our grasses, be sown with a view to twelve or fifteen years continuance;—if wet lands, at an expense of from five to

ten pounds an acre, are to be divested of their superfluities, and not till after a series of years to afford remuneration ;—if shallow soils are to be deepened, by either fetching up an under-stratum that may, without great expense and superior knowledge, remain crude and unproductive several years afterwards; or by superinductions of other earths, brought at still greater expense from a distance ;—if sands and clays are to be mutually improved by an interchange and partial removal of one to the other, or the latter to undergo a lasting transmutation and melioration, by being first underdrained, and then burnt in the mass ;—if a breadth of irregular surface is to be shaped for irrigation ;—or if broken or decayed boundaries are to be restored, or new ones formed in their stead ;—whether the nation can have any rational hope, (seeing it has not hitherto been generally prosecuted by any party,) under certain *fashionable* prescriptions, of their being executed by any but renters, of weak heads and long purses? and whether in such case the purses may not sooner be drained of their contents, than improvements be consummated on the lands?

Opposing an unconstitutional Bill, brought into Parliament Tuesday July 16th, 1811, by its then first Minister, “ the Right Honourable Gentleman ought to have known,” said Mr. Whitbread, “ when he was so lavish of his encomiums on the “ resources of the country, that the basis of these

“resources is agriculture; that the basis of agriculture is *confidence*, and that confidence is created “by the existence of *long leases*; which would be “put an end to by his bill. I shall therefore,” continued Mr. Whitbread, “as strenuously oppose “its first reading, as I would the opening of Pandora’s box!”

Whatever might be Solomon’s idea, when comparing “words fitly spoken to apples of gold in “pictures of silver,” Sir John Sebright’s idea was, no doubt, clearly understood, when in the chair at Freemasons’ Hall he gave as a toast to the Smithfield club, “Long leases to good tenants, and let no “man’s industry depend on the *whim* or *caprice* of “another!” The application here of the two words *whim* and *caprice* conveyed more of useful, patriotic, and *political* idea, than might two thousand from the pen of an inexperienced writer. Were a fleet of Indiamen, completely freighted and victualled, and necessarily furnished with anchors and cables of enormous size, to be legally detained in port by a thread in the hand, and during the *whim* and *caprice* of its keeper, it would not appear a more ridiculous opprobrium on our commerce and navigation, than does, in the case of our more important concern, agriculture, the legislative sanction of tenants at will, restrictive covenants, six months notice, &c. &c. &c.

Whilst manufacturers of almost every description have seized with avidity every improvement that genius has suggested, and spirited enterprize drawn forth, it is surely to be regretted that in the most interesting of all our secular concerns, the procuration of our daily bread, neither genius nor enterprize have found *efficient* encouragement; and that respecting superior and inferior modes in the operative processes of our culture, we are as yet, with some exceptions, altogether undecided; although the multiplied claims of an increased population, and the unprecedented exigencies of the state, demand, in the most emphatic tone, that every talent should be called into action, and every nerve exerted, to enlarge, by improved modes of culture, our internal resources, and to draw from the earth those supplies that shall be adequate to our wants, and which nature, assisted by art, would be still capable of yielding. While, whatever may be the cause, the only fact worthy of regard is, that, from the necessities of the times, all parties are so driven to attend to immediate supplies, that more distant and prospective, though two-fold emoluments obtainable from superior culture are totally disregarded; and whilst our lands, by means of enlarged consecutive systems, rotary arrangements, and subservient diligent prosecutions, under leases of length and security *sufficient for remuneration*, would afford us abundant support, and equal to all our wants; we are necessitated to com-

pound with them in many instances for half such produce; nor is the event the less certain, from that our tenantry are not now more disposed to engage in, than are their landlords to grant them, longer terms of holding.

“It is an axiom,” said the late Sir John Call, only thirteen years since, “that population will continue to increase as long as provisions can be raised on the soil, or procured on reasonable terms; let every one, therefore, who considers the subject, form his conclusion of what our situation will be ten years hence, unless some proper measures are taken to meet the exigency.”

As, however, few radical measures have been since taken to meet such exigency; as no one has since chosen preventively, as advised by Sir John, to consider the subject, and as all he then prospectively and without need of prophecy foresaw, has in our intermediate experience *taken place*, will not the question, “What will be *our* situation ten years from *this time*, unless some proper measures are taken to prevent it,” come with tenfold force and interest?

It may be the opinion of some people that the wars will cease, and plenty in consequence abound; but admitting the uncertain event, if abstractedly, and in conformity to Sir John’s axiom, an increase in our population commensurately abound, *cui bono*? May it not be as necessary to provide for exigencies in one case as in the other? If an increase of mouths

in our national family of 1,500,000, (being more than a seventh of the whole,) as asserted by Mr. Rose about two years since in the House of Commons, has within the short period of about half a score years absolutely taken place, together with more than a doubling of price of all articles of food, the cultivated produce of our soil, and both, on the whole, are progressively advancing, are we altogether so infatuated as not to ask ourselves, “*to what* are “they so advancing?” And not to recognize what to such a question *must* be the reply, viz. their *ne plus ultra*, as all progressive things must do?

If it may be justly observed at the present period that the world at large is new and awful in its proceedings; and as during the immediate unprecedented convulsion, “England expects every man to do his “duty;” one would naturally suppose that the first thing to be attended to would be, by a removal of every prevention, to *enable* every man so to do.

Had it not, from the wise foresight and paternal regard of our afflicted Sovereign, and also of the late Duke of Bedford, Lord Somerville, Mr. Coke, Mr. Curwen, and a few others, become *fashionable* to bestow some little attention on the art, we might probably long ere now have plunged far into the unfathomable depths of famine, and partaken of its many dreadful concomitants and appendages. Nor only with a view to the support of a government protecting them, with all others, in the enjoyment

of their possessions, did these worthies in due time step forward, but, with a discernment and application equally superior, employed the most efficient of all agencies for their certain immediate and permanent improvement. While if, on the contrary, lands, when improved by our tenantry, are, by practices at this time too prevalent, to be ingeniously wrenched from their occupants, and afterwards announced to be *let by tender*, or from year to year; it needs no proof that none but men of either covered design, or others devoid of common understanding, will be found to supply their places.

If our population has increased a seventh within the short space of only half a score years, and if an increase in our importations of grain has therewith kept pace; and only twelve years ago, it in one critical season (1801) amounted to upwards of ten millions sterling, and in the next to nine millions more; during which first year, notwithstanding, the poor-rates of the kingdom arose to ten millions sterling, while many of the lower orders perished from hunger, and all were greatly deteriorated;* and from these

* Although we are (in some sense perhaps wisely) prone to forget our difficulties, these are generally of a more *lasting*, as well as of a more serious nature, than is by many apprehended. In 1803, not a year of scarcity, the relief of our parochial poor, together with the removal of vagrants, amounted to 4,267,965*l.* the greater part of which was distributed in money, and to not less than 1,234,768 persons. Corn imported into Britain during the last 21 years has cost 58,634,135*l.* while 2,829,947*l.* were paid between 1796 and 1803 as bounties thereon. How small a part of these sums,

and other considerations, it is daily more and more apparent that the support of the people is progressively and in a new way becoming dependent on the produce of our lands, and dexterity of their managers; *wisdom* surely now calls loudly on every thing rational, every thing serious, for immediate attention to the subject. And if the necessity for giving at once full scope to the powers of the latter, and that their property, when vested in the soil, (and therein as essential to such produce as seeds of grain to a future crop,) should be guaranteed to them sacred and inviolable, *is not seen*; it can be only by those who are determined to shut their eyes against it, and who would probably be equally determined to close their ears against its confirmation, though one arose from the dead to announce it.

While the promotion of all the comparatively insignificant and frivolous arts of life every where abounds; whether the encouragement, patronage, or even countenance of one that supports and preserves them all, may ever be thought worthy of national attention and determination, or deserving of schools or academies; or whether, *maugre* private struggles and public difficulties, it is to remain century after century in lasting neglect through

and other similar outgoings, expended in reclaiming our wastes, might long ere now have sustained an independent population of thirty millions at least, and, in case of war, enabled us to bid defiance to a world!

future ages ; must be left to the wisdom of the Legislature. It may here, however, with some view to the former, be in point to bring forward a few of the most glaring of its defects, which necessity at some future time may compel us to ruminate on, and which we may then perceive ought to have been considered sooner.

First, To obviate the ground of our frequent migrations to the colonies,* the want of an Act for a general inclosure of the infinitely more valuable lands within our own insular boundary.

Secondly, The want of a general adoption of the convertible system of tillage ; and therein tearing up occasionally torpid and mossy pastures, never *laid* but *left* down, and frequently in so exhausted a state as to be no longer worth ploughing, and consequently in the most *unfit* state to have been so *left* ;† and

* “ These are the children,” (said Dean Tucker, in a letter to Lord Kaimes 1782, speaking of America,) “ or colonists, or fellow-subjects, or allies, or whatever else you please, in whose quarrel we have spent so many millions, and spilt such torrents of blood ! In short, and to sum up all at once, I look upon it to have been a very imprudent act to have settled any distant colonies at all, *whilst there remained an inch of land in Great-Britain capable of further cultivation.*”

† “ The A-b-c-darian, who in horn-book at school
“ Eats his cake, and then cries for’t, we whip for a fool.”

And John Bull, (or, if you would rather, Britain personified,) without knowing or caring for it, endures a continual and well-deserved scourging, for *laying*, as he is pleased to term it, but in fact *leaving*, his lands down to grass, after they have been thoroughly exhausted by corn crops. John, however, howsoever

afterwards at discretion returning them to pasture in an improved and appropriate one.

inconsistent in his farming, was never so with respect to his character; having always and avowedly piqued himself more on his knack at ambidexterity, than congruity or discernment; and frequently, while in times of scarcity and dearth, he with one hand supplicates in his churches the Author of all good gifts for plenty and cheapness, he with the other takes care to prevent their possibility, by withholding in various ways their means, and not giving the plough free admission to his immense tracts of wastes, nor withdrawing it from those of aration till they are completely exhausted of all the fertilizing gifts of heaven; he thus renders them both comparatively useless.

Lands having been worn down to a thread-bare state, unless they are from some subterraneous or other cause eminently fertile, may, without manures proper for recloathing their nude particles, so remain for ages. In a certain case, on a barren tract that had been sown year after year during a long period successively with oats, till in the common phrase it would not bear a new one for an old one, and then no longer ploughed, had been often remarked a small spot of a very superior cast, producing grass abundantly, whilst nothing of the kind was seen elsewhere around it; and which, after many conjectures respecting its cause, it was at last developed by an elderly person recollecting that forty years before a single waggon load of dung, merely to unload the carriage, had been thinly scattered over its surface. This one would conjecture (although it may not be right to rely much on analogy) is illustrated by the operation of the *crassamentum* or cruor of the blood in the animal system, which, considered as a *vinculum*, or bond of union for its other components, may become a medium or vehicle for its caloric, and thus preserve a uniform temperature through the whole of its mass; and which we may suppose is one operation of the mucilage in both animal and vegetable manures, while it further constitutes in earth a ground for their fermentation, attraction of atmospherical properties, and stimulus for the extension, and pabulum for the growth, of the vegetable fibre.

A recent discovery of M. Saussure, to be noticed further on, if in practice it should hereafter be found to be depended on, will prove a most satisfactory development and illustration of the phenomena;

Thirdly, a general exemption from those embargoes on all improvements, short leases ; tenants *at will* ; tithes in kind ; lettings by tender ; selling improvements already made by tenants ; suffering insidious agents to pocket, in any way, improver's money ; retaliations of an abused and provoked tenantry by depredation, spoliation, &c. &c. ; and wherein landlords themselves, by the way, seem to take a joint share, as if intending to leave their domains to some invading and approaching enemy ; and while they choose not to grant leases, and thus forfeit their power for raising their rents in case of any unforeseen change in things, and tenants as wisely take care not so to improve their farms as to put it in their power ; whatever the demands of an unprecedented war ; whatever the demands of an increase, equally unprecedented, in our population ; still is the community destined to sustain, year after year, privations and calamities undescrivable, only to indulge the parties in playing their puerile game of keeping each other at bay. Hence, in natural course, disappointment and chagrin, from so wretched a system, begetting in the minds of our tenantry dereliction, torpor, and inaction, they further together engender as fixed an abhorrence of even the word

and as a foundation whereon to raise a structure, jointly theoretical and practical, for agricultural science, (although probably never so apprehended by the chemist himself) one of the first discoveries of this or any other age.

science, as if its utterance would fracture their jaws ; or however as seriously implying, as they believe, a something extremely difficult of attainment, and when attained, solely at the disposal, or subject to the avarice, whim, or caprice of others, not having the least knowledge of, or respect for, the difficulty of its attainment, regard for its consequences, or for any expence attending its application. Whence, and as necessarily as sparks fly upwards, or water runs down hill, often result miserably defective occupation, in an avowed disregard to every means of irrigation of meadows ; utter inattention to an extirpation of weeds from arable lands, and by means of *preparatory* drilling, and *conclusive*, expeditious, and effectual horse-hoeing, (the first essential to a proper commitment of seeds, but much more so as necessary to a matter of the highest estimation, viz. the hoeing,) appropriating the latter to better purposes, viz. draining ;—marling, claying, and mechanical and chemical superinductions, and mixtures of every kind ;—intersoiling ;—introduction of northern plants and roots for support of winter stock, in lieu of that most expensive of all articles, *hay* ; as, were such plants and roots generally cultivated, and with a moral certainty of success in our comparatively milder clime, the produce of summer pastures might then be applied to soiling more profitable early-ripe stock, to be sold at an early age, instead of carrying it on only to be, in

like manner, supported through *another* winter, by a supply of *more* of the expensive article *hay* from a *succeeding* harvest. Lastly, a too great disregard of the mechanical powers in general, and particularly the neglect in not adding to our now portable threshing machines portable threshing floors also, whereby, instead of hauling corn in the busy time of harvest a mile, more or less, and frequently up and down hills, to a farm-yard, with the very frequent loss or injury of such corn by its delay, and at a subsequent season hauling back its bulk converted to manure, and *eight times increased in weight, to the same or some adjoining field*; and whilst, instead of such miserable management, (sanctioned only by custom and prejudice,) such corn might be stacked in the field destined to be manured at the ensuing season, and where its straw would be converted with a view thereto, in warm folds walled with stubbles, and bedded with *proper* earth for a compost for said field, previously and preparatively stationed for the purpose;* and from

* These floors might be easily formed of boards of only an inch thick, nailed on well-constructed frames of three-inch plank, set edgeways, with four oaken or cast-iron wheels or trunnions, of about eighteen inches height and eight or nine breadth on their peripheries under them; and two of them contrived for locking or turning. On the outward extremities of the floor might be raised side-walls, and a roof of light framing timbers, to be covered with thin sheet iron, and the whole painted over inside and out. Through the floor might rise a perpendicular shaft for the threshing machine, to be actuated by a horizontal tumbling ditto, working under

whence both operations, *i. e.* harvesting and manuring, would be so facilitated as to be completed[?] in their proper seasons, but which, by a present too general practice, are frequently either not completed at all, or at best so unseasonably, that it might have been better if they had never existed. From our unprecedented exigencies, however, and the extravagant prices of all agricultural produce, we may observe that there has recently awakened among

ground for the horses to walk over, on the outside of the floor or barn. Thus contrived, it might be moved from one rick to another, by the men and horses necessarily attending its operations, and be again set going in two hours' time. The system, in all respects but that of the projected barn, has already, and with every advantage, been put into practice; and wherever, in a sextennial routine, a field was destined for turnips, stubbles, mofs, and every kind of vegetable refuse, (having been collected by a powerful rake drawn over, and thereby cleansing daily ten or twelve acres of land, by means of two, three, or four horses after harvest,) were brought before winter, and walls built therewith on three sides of an appropriate yard, left open only on the south. Hereto threshed straw from the barns, hay, turnips, and every necessary provision, were also occasionally brought, and the whole converted into a compost manure by sheep or cattle through the winter and spring seasons. A tub was further necessarily placed in the yard for water, and which was daily supplied from a barrel-cart taken daily backward and forward by horses or oxen, in their way to and from plough; while for the latter, however, the yard was generally a nightly receptacle and asylum.—Hereby a field of near fourscore acres has been laid, from end to end, under luxuriant turnips, where in a prior instance, under a necessity for the manure being brought thereto, and in part up a steep hill a mile and a half from a farm-yard, not near half of it could be so cropped. For the above portable barn, a moveable sail-cloth, so contrived as to be conveniently applied between it and the rick in wet weather, would be found necessary.

even our renting professors a spirit of enterprize with also a dawning of attention to improved practice, that, if wisely attended to, and duly cherished, might soon be productive of very desirable consequences. How much of melioration therein now discernible, though never yet attempted, need not be pointed out to those who have turned their thoughts to the subject : whilst, for the information of others, it may not be superfluous to instance the certain consequences, if not suffered to retrograde, of the recently-adopted system affording winter-food for sheep and cattle. The writer (with certainly many others) has retrospectively in view a period when such supplies were so altogether deficient, or at best precarious, that frequently all, or nearly so, of animal increase gathered at one season of the year would be lost at another ; when our sheep, having barely recovered during the autumnal season from a pinch in the preceding spring, were frequently as liable to another in the succeeding one : when our common turnips (very precarious of obtainment at all) would frequently, after the frosts of January, be of little value, and more fit, from their putrid state, for generating disease, than promoting increase in creatures forced from hunger, and frequently more from thirst, to feed on them.

These facts duly appreciated, not longer ago than the year 1776, induced the writer himself to make trial of every article from which he supposed might

be obtained a spring food for sheep, when he soon found, as preferable to all that was then known, the drum-head Scotch cabbage, for succeeding immediately after the January frosts to the common turnips, whether decayed or sound; and which, in a very superior way, sustaining them, particularly ewes with their lambs, till the middle of April, the Lapland turnip (improperly called turnip-rooted cabbage) then came forward in the greatest perfection, and supported them (the latter frequently to fatness) till the middle of May, or till the natural pastures had yielded a full bite of grass, howsoever backward the spring; and which head of grass so secured, keeping out afterwards the too powerful rays of the sun, not unfrequently preserved itself through the ensuing summer.

Still, however, although such practice and supply continued for more than twenty years, so low was the price of all agricultural produce, and so great in consequence the listlessness of its possessors, that although his success was universally acknowledged; although he was repeatedly and liberally honoured with premiums for the same by the Society of Arts in the Adelphi, and more repeatedly honoured with many hundreds of his neighbours' sheep, carried gratis through the difficulties of the spring season; and although he constantly, on the same terms, furnished them with seeds for raising the plants themselves; yet could he barely keep the culture alive in

the vicinity during his stay; and as, at the time of his leaving it, a succedaneum was fortunately found in a turnip from Sweden, more reconcilable to the common modes of culture, and that could be raised without transplanting, which the other required, it went out altogether. He yet hopes, however, that the pains he took, and expense he was at, in endeavouring to promote its culture, were not thrown away; as when at some future period its comparative worth may be more justly appreciated, it may be again called into use.*

As prior to the use of this plant the growth of sheep was frequently from want of sustenance interrupted, and as they may now, by means of these northern plants, be regularly and amply supplied from their birth to their maturity, they will necessarily greatly improve (indeed are already fast going on) in size, shape, and quality.

With regard to the practicability of bringing agriculture, were its impolitic barriers removed, under the controul and direction of the rational powers equally with the other arts; give a poor man, possessed of a good head, a benevolent heart, and beloved wife and family, although he should not know a letter of the alphabet, give him a quarter of an acre of ground, and as a proof and example of what might be extended through an empire, the

* For the proper culture and use of this plant, see vol. ix. p. 257. of the Society's Papers.

whole of the defects, omissions, and preventions before spoken of, and hitherto deplored, would be swept from his occupation at a stroke. If not more than four inches below the surface of his garden were found a rock of granite, or of marble, howsoever mysterious, its mould would someway soon be seen to deepen, and all his plants to flourish.* While, like the insect *centipede*, (aptly compared by Montesquieu to large bodies of men assembling for public good,) while the reptile with its hundred feet is crawling a yard, a flea with its two will hop a mile! Thus it too often happens that such bodies, by the mutual jarrings of their separate interests, their versatile undisciplined opinions, and thence arising individual crooked policy, only serve to prevent the efforts of each other, and to leave, as we have cause to deplore, our more improveable rocks as thinly covered, and their coats of soil as barren as nature formed them. How often do men, like the mimicry of children, assemble, *pro bono publico*, only to play at reform; for nothing better than affectation (mockery apart) can it properly be styled, while a citadel is burning to ashes, to be determining by vote the turning a river to extinguish its flames. After

* It is said of the Isle of Malta, containing upwards of 90,000 inhabitants, that great part of it was originally little more than a naked and barren rock; but that there has, age after age, been brought from Africa, a distance of at least 200 miles, such quantities of earth, that it is now become fertile, and prolific of corn, lemons, cotton, &c. and vines producing excellent wine.

the dreadful ravager, the small-pox, had been allowed for ages to prey on, and in some instances to sweep off half the human species, *Jenner* aimed a stroke at even its existence ; and but for a singular pertinacity in a class of his countrymen, would long since by Divine aid have wrought its utter extermination ! Thus too has *Lancaster* been happily contriving to cut off the chief source of mental depravity, with probably much of corporeal evil, at the root.

Respecting the performance spoken of at page 275, of a single horse having ploughed an acre of a two-year's ley, four inches and a half deep, in four hours and thirty-five minutes of time ; its author, using on the occasion every exertion to excite an increased attention to a matter of such signal importance, thought himself justified, and indeed to be only consistently following up what he had many years before successfully begun, in offering soon after, at one of the Society's meetings, to back a plough capable of such a performance, with five hundred guineas, against any other instrument of the kind in the empire. And truly it is melancholy to reflect, that while no further inference, comment, or animadversion ensued from it, that soon after was witnessed, within a mile of the seat of a Society, instituted now more than thirty-six years ago for promoting *agricultural improvements*, a single plough drawn by three horses and four oxen, on land that had been fallowed only about a month prior to the *tremendous* operation !

And also another, within about five miles, with six oxen and four horses, whose superintendant, on being expostulated with, complained much of the want of *more strength*.

As in certain parts of the kingdom not more than two horses are customarily employed to draw a plough, and in others five, six, and in some seven or eight horses or oxen, are as regularly applied for the purpose, we may venture to reckon on four as the average number so employed throughout the empire ; nearly coinciding with the estimates of several of our more able calculators. And while as great a number of instances might be produced where even one horse would be quite sufficient, as of others where *more than two* would be necessary ; it may be inferred that two horses generally for working a plough would as certainly be sufficient as that four supposably are now retained for the purpose: and as a most intelligent and well-informed member of our Society, Mr. Curwen, reckons on no less than a million of horses kept in the empire for draft, and that they annually consume the produce of four millions of its invaluable acres; it follows, that by an universal adoption of light improved ploughs, and a series of improved instruments to be used in succession, (and which, by the way, the writer thinks it a duty strictly incumbent on him to declare, that when *properly* called on, he will pledge himself, under Divine aid, and without expense to

any other individual to produce, and superior to any thing of the kind hitherto exhibited, *the contrivance of an individual,*) by a general adoption of such instruments, if better be not found, a curtailing of the number of these expensive, though, where necessary, invaluable animals, might take place of at least three hundred thousand. And if of such we reckon the keep; harness-makers', smiths', and farriers' bills, interest of cost; taxation; loss by decay, &c. &c. the annual expense incurred by them will on an average fall not short of forty pounds per head to individuals; and consequently in the aggregate to the nation, present to our astonished view the sum of twelve millions sterling! And which, at the recently adjusted price of twelve shillings* per bushel for wheat, would furnish bread sufficient for near a third-part of our population!

It having early in life fallen to the lot of the writer to have an interest in studying the plough, he was fortunate, even before the institution of the Bath Agricultural Society, in discovering some peculiarities necessary to be regarded in its construction, although never noticed before; and by attending to which he was enabled to perform more work with two horses than he could previously get executed by four.—Their powers happening soon after the discovery to attract notice, a bet on them, unknown

* The article for a whole year afterwards, if not more, averaged not less than 15s. per bushel.

to himself, took place against those of another then celebrated plough ; and in contending with which the new plough, even with a single horse, performed much more and better work than had usually been done in the vicinity with three, four, or five.

The stubborn fact, witnessed during its performance by some hundreds of spectators, in some degree set aside the well-known antipathy to every thing *new* in such vicinity, and ploughs of similar construction were in consequence soon very generally employed. It becoming natural, however, wherever they had appeared, for ploughwrights to imitate them, and who having in almost every instance introduced some fancied improvement, topical innovation, or *deteriorating amendment* of their own, every vestige of principle in them soon began to disappear.

Having since its period had frequent occasions to deplore the inefficacy of the modes both of the Board of Agriculture, and also our Society, for recommending them to general use, the writer has at every opportunity exerted his utmost endeavours to excite an increased degree of attention to it as to a matter of the utmost moment ; and having in several instances displayed its singular powers, he further to awaken attention, thought it his duty, on a requisite occasion, to propose to the Society the bet above-mentioned.

From accounts in the writer's possession, obtained from all parts of Britain, from France, and

from America, of their greatest performances in ploughing, whatever may be the *cause* here of the comparative disregard and inattention to such matters, it is at least worthy of remark, by whomsoever made, that no public exploit therein has ever yet equalled the one above described.

As the Board of Agriculture, together with all our numerous Agricultural Societies, are still in the practice (I had almost said habit) of offering premiums for *better* ploughs; whether candour, allowing us to have deliberately proposed therein the *best* and most important *end*, will as readily admit of our discernment, patriotism, or *sincerity*, in “*the fixed choice and steady undeclining pursuit of the most proper and effectual means in order to promote it,*” the writer does not presume to decide on. But as some have appeared curious to know his motive for staking a bet of not less than five hundred guineas on the merits of ploughs, and as others may probably be equally so for that of his pledging himself on certain conditions to produce instruments for every other purpose in the fields of culture equally superior; it may not be irrelevant to observe, that *trivial means*, (seeing, from thirty years close attention to the subject, it has been clearly ascertained they produce no end whatever) have certainly been tried *long enough*; and however *grating it may be* to some, not having been accustomed to ruminate thereon, to hear it is equally certain that doing things for *no end*, if

not as wise, is certainly as idle, and even more childish than doing nothing at all; whilst with regard to the consequences of so passing through life, it might be going out of the proper line of the writer to descant on them. He hopes, however, that he may be allowed to observe, that had it never been permitted to back horses on the turf with more than five hundred farthings, we should not at this time have it in our power to breakfast at Bath, and sup in London; but preparatorily, as formerly, making our wills, have been content to take chances therein for life or death in a four or five days journey.

Having now more than thirty years sustained a consciousness of the superiority of the above plough, and having had frequent occasions for winking at the pretensions of others thereto respecting their inventions, although patience be in general a cardinal virtue, longer forbearance in this case, in not publicly announcing the powers of the instrument, cannot be entitled to the claim of even a negative one; and impressed with a sense of the consequences of the neglect, and that by continuing to acquiesce in it, a long life of ardent though otherwise successful pursuit in a matter of the first moment must be childishly thrown away, he some time since had the honour of submitting to the Society's inspection the operation of a machine for determining the momentum of desultorily resisting force, found in all soils more or

less, to the agency of ploughs, and all other machinery actuated by our quadrupeds.

And as by the invariable law in mechanics, that whatsoever is gained in power must be lost in time, and *vice versa*; and as in decisions of instruments for this purpose, the two are necessarily so indiscriminately blended as not to be *separately* ascertained; this machine is calculated to measure their momenta in a blended or combined state; and as by means of which, and probably which alone, any thing can ever be found competent for the purpose, it has legitimately, and in contradistinction to others, been styled *dynami-chronometer*, i. e. a measurer of time and force conjointly.

The French call an instrument for the purpose *dynonometre*. Their celebrated artist Regnier, having been applied to by the philosophers Buffon and Gueneau for an efficient one, furnished, after dilating largely on its difficulties, what he pronounced as such; while, however, not being aware of the necessity for the instrument's measuring *time* as well as *force*, and that without it one must be imperceptibly and continually mistaken for the other, the discovery eluded his search; as (and from the same cause) it had that of Desaguliers, Le Roi, and Graham before; and has since of Macdougall and many others. Macdougall, indeed, informed me, a little before his decease, that he thought the discovery impossible, from a want of data whereon to

ground an attempt; and further consulting afterwards, one of our first engineers on the subject, it was remarkable that he made the very same observation; and from whence it may be supposed, that the subject having been publicly canvassed, the idea had become general.

The machines of the above authors having been calculated for stationary resistance only, or more properly measuring force without providing for its fluctuations, where the former yielded to the impulse of an actuating power, would be too vague and indeterminate in their decisions for any useful purpose whatever; and indeed be found little more than mere dynamoscopes for indicating a difference; whilst dynamometers would afterwards be wanting to measure it.

Our compound instrument having been inspected by a very discriminating and able member of the Society, Dr. Wilkinson, has been pronounced by him, as he believes, fully adequate to the ends for which it was designed; of which indeed the author, from reiterated and continued trials, had long himself been conscious; and from a conviction, ever on his mind, of the universal and absolute necessity for such an instrument, he now, in unreservedly announcing its powers, and the intention in their application, finds it equally necessary to discriminate between a certain affectation of modesty (sophistry, properly,) and a manly determined resolution to

impress on minds condescending to acknowledge an interest in the different modes of procuring their daily bread, whatever he believes may conduce to the benefit of others, and the general good of mankind; and which, in the words of the venerable author, quoted as maxims of truth early in the essay, he presumes is not more or less than “*knowledge digested, a wisdom including design;*” and “*the fittest end having been proposed, fixed choice, and steady undeviating pursuit of the most proper and effectual means in order to promote it.*” “Whatsoever thy hand findeth to do,” (says Solomon,) “do it with thy might; for there is no work, nor device, nor knowledge, nor wisdom in the grave, whither thou goest.” “Withhold not good from them to whom it is due, when it is in the power of thine hand to do it,” And “while we have time, let us do good to all men.”* In order hereto, however, it may be at least regular, if not relevant, first to contemplate the means; and wherein will be seen, whatever the cause, not only the unimproved state of the agricultural art, *compared with all others*; but that it must in great measure so continue while the unimproved state of its terms of communication

* A little practical knowledge, intentionally and appropriately used, is of more value than worlds of theory unapplied. Judging of the intentions of some studious men, one would think they accumulate science with no other view than to hide it, with all its benefits, from their contemporaries, and to take it with them for those of the inhabitants of some future world,

remains so. It will be obvious that a ship on the seas cannot be more necessary for conveyance of merchandize from port to port, than a specification of terms for communication from mind to mind of distinct ideas; nor indeed is it more probable that great improvement in any art can ever take place without mutual aid, than that a single ship, competent in itself, should be able to withstand a fleet in battle. "Men can never understand one another," (says Dr. Desaguliers,) "till they mean the same things by the same expressions. No disputes arise in the pure mathematics, because the definitions are premised, and every body that reads a proposition has the same idea of every part of it."

To display the necessity for a general glossary for the purpose, whereby professors in agriculture, as in all other arts, might be enabled to receive and communicate knowledge to and from each other; and instead of individuals using each his own terms, and thereby preventing others from understanding what he may be talking about; a single specimen of the vague, uncommunicative state of the nation's agricultural phraseology, it is hoped, may suffice; the whole, indeed, would be endless.

For the article *Balance*, (to be so termed, and further treated of hereafter, and thus entitled, with a view to intelligence and information,) we have the following *respectable* string of *specific* synonyms, viz. sway-bar, splinter-bar, draft-bar, drawing-bar, draw-

bar, whipple-tree, swingle-tree, swivel-tree, *whiffle*-tree, *totter*-tree, *supple*-tree, swing-tree, rock-tree, land-tree, pull-tree, horse-tree, cross-tree, whipple, whippens, team-band, gambrel, gaupas-stick, and (probably given by some tailor, transformed to an agriculturist, and having no more appropriate idiom) *badkin*; and which latter, from time immemorial, through great part of the British empire, has been carefully handed down to the present æra! Probably too the provincial terms *fitch* and stitching-up, for ridge and ridging up of ploughed land, at this time very general, may boast a not less respectable derivation. The very general term *yoking* for *harnessing* horses is still more respectable; the animals being frequently employed in drawing ploughs as well as oxen, the latter *subjugated*, by having their necks brought in pairs, each *under* a heavy, wrenching, galling *yoke*.*

* As no degree of excellence can ever be attained in any art whatever without its terms have been previously settled, it is obvious, from the numerous rag-stones (provincially hitchers) still found in our arables in the immediate track of the plough, that

none has ever yet, since the Deluge, or some other great convulsion of nature, taken place. These stones, with their backs scratched and furrowed through all ages from time immemorial by the plough-shares of our ancestors, and under which, on their removal, are sometimes found mally points of such shares broken off from ploughs, and by means in former ages, (whether hundreds or thousands of years since,) equally and unnecessarily strong and heavy, rendering the labour of the ploughman more than three equally un-
-manufactories,
-ly lacerated

This unmeaning phraseology has been thus tediously dwelt only to exhibit the neglected and thence indeterminate state of the art itself. To the throwing a bomb in tactics for the *destruction* of our species, a combination of the greatest refinements in geometry, the mathematics, and almost every physical science is necessary, and employed. In the raising bread, the staff of *life*, and support and *preservation* of ourselves and fellow-creatures, little more is seen of the benefits of science in general, or advantages of the mathematics and geometry in particular, than in the costume of cannibals, or economy of the Arabian deserts! In the arts of making and dying cloth; in the fluxing, amalgamation, and refining of metals; in chemistry, in physic, in navigation, and, in short, from these gradually down to the mending of kettles, no writer will dare aspire to give instructions to practitioners in any of them, without first displaying superior discernment in the respective arts, confirmed in practice by himself: Whilst so generally debased and disregarded, and in consequence so neglected and vague, is the science of agriculture, that any London garreteer author, without fear of reprehension, may deal out *instructions* for *the farmer*, and which *the farmer* he in his conceit only treats

and torn to pieces by such stones; and which, during present exigencies, would open to the benevolent mind a glorious display of ground for improvement in the art, could the many existing and ill-conceived manacles of retardation be taken off from her hands.

as a species of being very different from human; a sort of non-descript, possessing human form, but without a grain of human understanding; a perfect Ouran-outang, but for the faculty of speech; and so deplorably unenlightened as to stand in need of mere information from even more impertinent bookworms, whose *instructions* demonstrate, in almost every line that falls from their pens, that, relating to practice, (*i. e.* the thing itself,) they know not comparatively a horse's head from a cow's tail!

And although we have happily to counteract the desolating effects of these empiricisms, many excellent works on the subject, from the pens of able, philosophic, and staunch friends of their country; yet from the foregoing reasons are farmers in general so little versed in chemistry and science at large, and so incapable of distinguishing, in the different works of preceptive authors, the good from the bad; and having incidentally, in some instances, been led aside by the latter, they too often set at nought literary instructions of every kind, and prefer the beaten track of their fathers, howsoever inferior, to others scientifically chalked out, and howsoever demonstratively their advantages may have been displayed.

Sorry am I to think it necessary here to allude to a certain practice of the day among authors, and for some of whom I should, under every other consideration, entertain sentiments of the utmost respect, that the contempt shewn by them for English farmers,

(and through their medium, indeed, the whole of the community subsisting on the produce of their labours,) when professing to write for their information, in a lengthened series of lemmata, hypotheses, phenomena, theorems, &c. &c. &c. in their solutions being curiously and not unfrequently wound up in Greek and Latin; and while they are conscious that every inquisitive reader not versed in those languages must conceive more of disgust thereat, than if invited by them to a sumptuous repast, and at the moment of setting to, an appointed banditti of foreigners should break in and dislodge them from their seats. Leaving, however, the merits of these authors for the decisions of others, I think for their general *reputation* they should recognise, whatever their pretensions, that the altitude of their *zeal for public good* is even to the thirds of a second hereby ascertained and held forth to public view.

As we are yet constrained to witness in some of our counties ploughs drawn by five horses at length, in others the same by four, in some by three, and in others by two; while in certain instances, even one horse with an instrument appropriately constructed, and on simple geometrical principles, has been known to complete its acre in as perfect stile, and in little more than half the time usually employed by either of them for the performance:—As in certain parts of the kingdom the greatest improvements in tillage have been wrought by the cultivation of

turnips, and which, from its justly-appreciated value, is now carried to great heights by the Tullian mode of treatment ; while in some parts their seeds are in a more uncertain way thrown about at random, and in others, if casually so obtained, they are not afterwards thought worth five shillings an acre for an hoeing, and elsewhere not worth raising at all:—As an universal variety of opinions yet remains in our different districts with regard to the quantities of seed of our different species of grain most proper to be sown with a view to increase, viz. from one bushel or less on an acre, to nine bushels or more ; and with regard to right and wrong, best and worst, much more of similar uncertainty, the above items are brought forward only to display the necessity for some national standard, some criterion of excellence, practically obtained, as a rallying point always to appeal to in matters of disputation, and which (strange as may appear its not having been yet deemed worthy of national attention) few will deny might be obtained by mere application for the purpose, in selecting instruments built on philosophical principles, and systematically arranging them, so as to act in consecutive subserviency to each other, calculated for an easy, accurate, and effectual culture of the earth, on rational and scientific ground ; and which, having been first investigated, and proved by practical and competent men, their reports to be then registered, and afterwards published and universally

diffused.—Should proof be required of its necessity, we shall have only to turn our eyes to the general apathy, remissness, and disregard of all excellence respecting our present agricultural machinery; and to observe with what indifference are *real* improvements therein, (determinate from their effects in operation,) as yet gazed at by our tenantry, while a preference is frequently given to *gimcracks* of pretenders, without in themselves, either an idea of practical culture, or the least competency in mechanics; although a connexion in the mind, as necessary to the formation of machinery *useful* in the art, as is a knowledge of both navigation and carpentry to the construction of a man of war. And how obviously is it seen that this insensibility is only one instance among many of that listlessness which their precarious and insecure tenures have rendered not only *habitual* but even *necessary* to their peace of mind: and whilst it is as absurdly as abusively imputed to an inherent obstinacy peculiar to the profession. How many renters are at this time known to the author, who, (when a candid declaration could be obtained from them, but of which they are for the most part extremely shy,) so far from purchasing superior implements at the recommendation of their landlords, have asserted that they would much rather not accept such from them, even as a gift; appreciating them only as preliminary to an advance of rent, and that commensurate with

their excellence. And although many, from founding reports of sheep-shearings and other annual fêtes, (while not without the highest and most grateful respect for their institutors be it mentioned,) may fondly suppose that the science now flourishes, and extends itself like a green bay-tree; yet herein are seen the certain and necessary effects of a corroding worm at its root, withholding every thing essential to its maturity, all that would otherwise raise it to its due elevation, and to requisite esteem. However, although an epigram on fordid landlords, written in the year 1639, runs in the following words,

“ These term themselves the pillars of the land,
 “ As though the realm on rotten props could stand:
 “ While those who tenants to the quick will pare,
 “ At best, if pillars, *caterpillars* are:”

It must be allowed to be a long lane that has no termination; and some of our greatest men, as well as soundest patriots, begin not only to perceive, but even *practically* to give into the position, that the only way to raise and support the realm cannot, in utter repugnance to common sense, consist in tying down the hands employed in furnishing the means.

From what has been before stated, it may be proper to observe that Seminaries are obviously necessary for imparting, at least to young, unprejudiced, and thence susceptible minds, the mensuration of superficies and solids;—the *real intention* in the application of superior machinery;—the efficient modes of

ploughing ;—and by means of an appropriate and unexpensive level, proper declinations for discharging superfluous water from wet lands ;—for upper and under draining ; for irrigation, &c. &c. ;—some leading points, essentially necessary to be known in the laws and economy of vegetables ; the conduct of certain chemical demonstrations of the mutual operations and influences of the elements, and correspondent effects of manures. The best modes of extracting all nutritive matter from different substances used in rearing, supporting, and fattening our quadrupeds ;—some outlines of the knowledge of medicine for removing incidentally their diseases ; the various applications of that simple, useful, and ever to be relied on, though hitherto neglected instrument, the thermometer, &c. &c. ; and which, it is to be feared, through the too general neglect and consequent ignorance of such matters, many, availing themselves of the fashionable mania for hobby-horse farming, mercenarily set up to teach others, without a competent knowledge of such things themselves.

When a tool in the hands of an artificer has been deprived of its edge, proper means are necessarily had recourse to for restoring it. Why our legislators, as land-owners, will not have recourse to proper means for rendering effective instruments essential to the attainment of our daily bread, and thence ensuing national security and duration, has

strangely *not yet* been deemed necessary to be enquired into! Certain it is, that were proper ideas planted, early in life, in the minds of the working bees of the British hive; were their painfully-collected and highly-valuable treasures afterwards as properly secured to them; and a sense thence inspired of some permanent interest in a soil highly valuable from its insularity, and their prompt exertions; then would they soon be seen gathering to themselves, and more particularly storing up in the minds of their successors, mathematical, geometrical, chemical, or whatever other scientific ideas it might be rationally supposed would conduce to their welfare, and the immediate support of their country; then would be seen the science of agriculture flourishing, simplifying, and laying itself open. While all that through ages has *hitherto* resulted from congregated assemblages of men, from *patriotic* institutions, the founding boasts of chemistry, the various learning of colleges, academies, universities, &c. nothing theoretic, and whereon to ground useful practice, has been yet brought forward, unless it be the fallacious position of the science, scarcely in embryo, being *yet in its infancy*. In few words, let our agriculturists perceive it to be for their real and permanent interests to become either themselves, or more properly their descendants, possessed of all knowledge necessary thereto; and it would soon be found more difficult to stop their career in pursuing, than it has been

hitherto to stimulate them to undertake it ; or resulting from their attainments, the welfare of the empire, and removal of many of its complaints and embarrassments. Then would they soon perceive it to be further for their interests, that Bell's, the Lancastrian, the Sunday Schools, and Bible Societies, &c. should have their full and proper effect, and

“ Sloth fly the land, and ignorance, and vice,
“ Of old dishonour proud.”*

Then, whether by permission only, or under the direction, of Omnipotence, a thorough purgation, it is to be hoped, of novel atheistical notions soon prevailing ; together with a dismissal of new-fangled diabolical principles, the singular increase in the population of quiet, protected Britain, during the general convulsion and destruction of the human species elsewhere ; we may hope would help to supply the defects occasioned thereby, and prove a harbinger of a more enlightened age ; more attentive

* Thomson.

We have it from good authority, that on the coasts of Cumana and Oronocco, in South-America, reside a race of Indians, called Ottomacs, of a very dark copper colour, and otherwise remarkably ugly ; and who at certain seasons of the year eat fern roots, and different reptiles, as lizards, &c. ; and at other times, rather than cultivate it, eat the earth itself, and of which they every day individually consume three-quarters of a pound, or more. It is sometimes proverbially observed by their more civilized neighbours, when speaking of any thing very filthy, that “ it is disgusting enough for an Ottomac to eat it.” They are for the most part a very savage race, and have an *insurmountable aversion to improvement*.

to the dictates of reason ; more conformable to the voice of nature ; and more obedient to the laws, and subservient to the will of that just and awful Power, “ in whom we live, and move, and have our being.”

Among other hair-brained schemes introductory to the French Revolution, a system was projected for rooting out every idea of religion from the human mind ! while a conflict, however, provoked thereby, although it has been ardent and of long continuance, has only served to display the superior and absolute powers of religion, and to raise her to her more just and due degree of estimation, and while we may now, and on the most solid ground, be grateful to the Omniscient for the good that is hourly resulting from the impious and infernal attempt. Shocked at the blasphemy, and starting and revolting from its idea, the mind flies for relief to things diametrically opposite. The abolition of the Slave Trade, a depravity of the most remote standing ; the diffusion of gospel truths into the minds of the lowest orders of the people, and thereby a knowledge afforded them of the means of eternal salvation ; a depriving that dreadful scourge of human nature, the small-pox (and some say another, the plague, by the same means,) of its powers ; among others, are benefits whose equal never before derived to human nature since the coming of the Christian æra. While, however, not going too far from our theme, if a necessity for an appropriate education of some of

our agriculturists too be not more clearly seen and attended to, they may probably soon be found behind in the scale of ascending order, and a link deficient in its chain.

Were it not a duty prescribed respecting our temporal as well as spiritual interests, not too hastily to give up our hopes, it would be truly melancholy to be persuaded that we can *always* continue to expect, and yet *ever* be deprived of, the produce of a land, which, by a rational and spirited application of science in the art of treating it would, under Providence, perennially flow with milk and honey; and men, nourished thereby, increase like bees in a well-furnished hive.

“ A good government” (said Neckar, the great financier of France) “ multiplies men, as the morning dews of the spring unfold the buds of plants.” Another more leading character there observes, that “ finances founded on flourishing culture can never be destroyed.”

If, coming nearer home, we should prefer sentiments of judges most competent among ourselves: “ The foundation of national prosperity,” (says Sir John Sinclair,) “ must rest on the knowledge possessed by individuals of agriculture, and all the other useful arts; and if encouragement were given to promote great and useful exertions, the prosperity of the British empire would increase with a rapidity beyond all former example; and even our

“ present heavy burdens would scarcely be felt.”
 “ A nation of agriculturists,” (says Mr. Curwen,)
 “ a nation which depends on its own resources, and
 “ has thirty millions of people, has nothing to fear
 “ whilst it is true to itself! Such a nation Great-
 “ Britain may be, if she pursue her real interest, the
 “ cultivation of her lands.”

By an improvement of waste lands, on his own domains only, the great Marquis de Turbilly, in France, gave birth to twenty thousand labourers and occupiers thereon; and had frequently, when on his morning rides conversing with them, to ruminate on so rapturous, so transporting a theme! What extatic sensations the mind of a Jenner must experience when ruminating on having been the instrument in saving from death, and probably with others from thence generating, seventy times that number in his own country, and a thousand times the same through the universe elsewhere, can only be known to himself. Our population, nearly stationary before, having increased, according to Mr. Rose, fifteen hundred thousand within these ten years; about the commencement of those years we may suppose Dr. Jenner's rescued fellow beings began perceptibly to propagate, and, as supernumeraries, to increase with the mass: But what coldness of heart, what a falling off, what inhuman defection in his ungrateful country, to refuse land to those thousands for their necessary support, while she has so

many millions of acres for which she has no other use than to feed geese, foxes, and every species of marauders and depredators ; and while the jarring state and menacing aspect of the world at large so loudly calls for defenders of our highly estimable and universally envied spot of insularity ! If in the present convulsed state of the world, even manuring foreign soils with British blood *be essential* to dressing our own afterwards with more proper materials, and necessity has no law, to what we cannot control we must submit ; but after so great a cost, can it be consistent, can it be rational, can it be in any sense necessary, that we should throw away our time and powers in depriving each other of the purchase? Nelson, Abercromby, and others gave up theirs, together with *their* blood, for the salvation of their country ; and if it be allowed that their conduct therein was truly generous, disinterested, and worthy of imitation, why, in so momentous a concern, were they duped in confiding that others in their wake would display equal intrepidity and integrity? And what are we to conclude on respecting certain powers that afterwards neglect, or others that more criminally deprive us of, benefits so dearly bought? How would the generous, the immolating, and departing souls of those worthies have shrunk from the idea of supposing an individual capable of supineness, coward deceit, or double-dealing in the disposal and economy of the insulated and highly valuable British

lands, so dearly purchased with the blood of our fathers, and by themselves, at the expense of their lives so well defended !

If arbitrating universally on the ocean, we are the only power capable of preserving the world from depredation, and mankind from slavery ; and if, notwithstanding, such power is generally seen to excite envy in surrounding and even protected nations ; whilst a general and almost avowed combination has been known for subduing, and then enslaving us altogether ;—and if in times of real exigence, and requiring every energy, a repelling and conservative power can only be found in union of mind and consentient effort ;—to suffer, under such conviction, tyrannical custom, indolent security, or a spirit of opposition among ourselves, to prevent a due regard to national safety, and the only means necessary to our future preservation, would appear nearly as wise as did Nero, when playing his fiddle to the burning of the metropolis of his empire.

Speaking of the waste of the human species by the natural small-pox, “ a more fatal disease” (says a sensible author) “ never afflicted mankind. But
 “ most happily a Jenner has appeared ! and the
 “ blessings consequent on his vaccinating system are
 “ calculated to reach to the latest posterity. On
 “ this topic the pen, not of adulation but of veracity,
 “ might be perpetually employed in a strain of the
 “ highest eulogy. In the Report of the College of

“ Physicians, on the utility and success of the Vaccine Institution, it is stated that in the natural small-pox, about one in six that were seized with the disorder died; by inoculation, about one in three hundred; and by vaccination, one in fifty-four thousand seven hundred and ninety-four.”

“ While thus we contemplate,” (continues the judicious author,) “ with the most solid satisfaction, this glorious novel scene of creation, if I may be allowed the expression, a new train of ideas is let in upon our minds, which should be traced in its present and future consequences.

“ If life, in the beneficence of the Creator, be permitted to flow in a more liberal channel than heretofore; it becomes more imperiously the duty of man to endeavour to provide a suitable subsistence for this vast increase of animation. Nature in fact teems with life; and earth, organized in her vegetable and animal forms, (in which latter man is included,) rises forth in resplendent view to excite the astonishment and gratitude of an admiring world!

“ The exertions of man, moving indeed in a secondary sphere, and acting in conformity to the will of an all-bountiful Creator, will naturally be directed to preserve this fair system, this beautiful order of things. And how can man, the subordinate agent, more readily effect this than by devoting his occupation and thoughts to the pur-

“ fruits of agriculture, which is the key-stone to this stupendous and elegant structure? The arduous labours of the field will accordingly form one of the most momentous and honourable pursuits in life.”

As during our stay on earth every day tells for one, and we can have no justification in withholding good from them to whom it is due, or taking away any existing means for promoting the welfare of our contemporary fellow-beings; after exhibiting a few preparatory phenomena, it is intended to give some account of the instruments spoken of at the commencement of the essay, and to which, both included, may be properly set apart a separate

DISSERTATION.

WHETHER previously known to the agricultural reader, or otherwise, it will ever, whilst he remains on earth, and for reasons very superior to the mere culture of his fields, be a subject most worthy of his contemplation, that preparations for the radical sustentation of the whole of both animal and vegetable life are constantly, and by the most sublime modes, carrying on in the great universal laboratory, *the atmosphere*; and which is sufficiently determinate from that given small volume or quantity of air,

confined with either an animal or plant, will furnish only a proportionate quantity of such sustenance ; and that then, by releasing it, it will again become charged with similar properties for repeatedly furnishing regenerated supplies of the same. The affinity or appropriate disposition in the parts of the great whole to combine and unite in so wonderful and glorious an operation must however remain as difficult for finite minds to account for or comprehend, as the affections of gravitation, or the properties of the loadstone : and as for the support of our present state, we are under no absolute necessity for knowing more than relates to a comparatively few proximate causes and effects ; and sexual intercourse is observable through all the works of nature, after all our most abstracted and philosophical researches, traced even to the metaphysics, the most candid as well as the most *learned* account we can give of them, is only, in short, that they like one another, and that they thence combine for the support of both vegetable and animal life. The origin of even the most familiar things around us we know nothing of ; cause within cause therein, and effect within effect, we do not perceive, nor have they ever once been apprehended by any one of the sons of men. Wheel within wheel, and world within world, they are probably at a greater remove from human understanding, than are those stars of the firmament from our earthly abode, whose light travelling nearly

two hundred thousand miles in a second, is said *not yet* to have reached us. As even the smallest seed contains within itself others for succeeding generations, as long as the present state of things may remain ; and as in the loins of Adam were deposited by his Maker those of the human race ; they stand confessedly matters of which we have neither comprehension nor knowledge. Hence, keeping clear of theories beyond our reach, and confining our thoughts within the boundaries of their proper sphere, we may there more appropriately concentrate their force, and thus more effectually obtain whatever is understood as necessary for our temporal support ; while the considerations of its beauty, harmony, and benign and obvious designs for good towards men, continually rising before us in resplendent view, will display the immediately operating hand of its great and divine Author ; and confirm our belief in his assurance, if we do our duty here, of his providing better things for us hereafter.

The phenomena proposed, although an attempt at their solution is necessarily with the Essay addressed to the Committee, it is however chiefly intended for the information of such of our practical agriculturists, as being habitually governed by sensible ideas only, and who laudably and diligently fulfilling, in their practical line, the duties of their station, have neither time nor opportunity for furnishing their minds

by contemplation with a knowledge of abstract matters in chemistry, and with whom some sensible ideas of such phænomena may be necessary to their perceiving *design* or *intention* in the operations of the following instruments, and which, once for all, if it may acquit the writer of an intention to mislead them, will also, he humbly hopes, exonerate him from imputations of pedantry, with those more deeply versed in the chemical art; and whereinfoever they may detect his errors, it is earnestly hoped they will rectify them, by which his intentions will be equally fulfilled; they being not more than barely, though in a somewhat new way, to set the study, *in its only useful place*, a-going; or (admitting the figure) that the seeds being threshed, we may, while our season lasts, *get them winnowed*, and commit them to the earth for regeneration and increase.

The science of agriculture, as its term implies, consisting in so disposing of the parts of the surface of the earth, as that they may most powerfully imbibe and assimilate the preparations of a superincumbent atmosphere for the support and propagation of certain select vegetables; and which, so obtained, supporting and thence propagating an appropriate selection from the animal world at large; they together include almost the whole of the support, accommodation, and increase of the human species, as the highest class of visible animation and intel-

lectual discernment ; distinguishing man (while the lower faculties are common to all) from the quadrupeds passive for his use ; and enabling the agriculturist to determine, that without its aid the fore horse in his team, if estimated from the application of other powers, would have the most just claim to priority in rank. And as such parts of the earth's surface, when judiciously and appropriately exposed, have always, more or less, great powers of attraction and affinity for different properties held in solution in the atmosphere, by its universal vinculum or bond, *caloric*, viz. carbon, oxygen, hydrogen, nitrogen, ammonia, &c. to be at all times obtained by chemical decomposition of animal and vegetable substances ; and which have each and all been found by different modes to be great promoters of vegetation ; it appears a self-evident conclusion, that on a knowledge and right application of the agricultural art, the physical existence of man in great measure depends.

“ The atmosphere” (says Mr. Adams, in his lectures) “ contains a mixture of all the active “ and volatile parts of the habitable world ; that is, “ of all vegetables, animals, and minerals :—what- “ ever perspires, corrupts, or exhales, impregnates “ the air.”

That this great conservatory (at all times abounding, more or less, with vegetable pabula, or the foods of plants) may also be considered as a laboratory for

preparing them, we shall have only to recur for confirmation to the operation and effects of *fallowing*; whereby a field naturally fertile, but in great measure divested of such food by constant cropping, will, on being properly laid open, imbibe from the sun and air, and retain, other properties similar to those it had before imparted and dispensed with; as these magnetic and retentive powers combined constitute, in their relative proportions, the *genii*, or characters of different soils, respecting their greater or less degrees of fertility.

Little is it apprehended by many a worthy character in the profession of this useful art, that he has, from the first breath he ever drew, been all his days subsisting on a matter now termed *caloric*; or, in other words, eating fire;* and that had he at any time been five minutes deprived of it, he could no longer have existed. Little, probably, is he aware, that with an irresistible propensity for inhaling it, together with the many matters of which it is the actuating principle, they have been constantly brought to and compressed, not only on his palate and every organ of sense, but also every pore in his skin, with a weight equal to fifteen pounds on every square inch of the same; and that, if only of moderate size and stature, he has constantly sustained on his own bodily frame a weight of upwards of thirty thousand

* Of this, however, the operation of the little common pyrophoric tube would, in an instant, convince him.

pounds of this highly-impregnated and *truly*-nourishing menstruum. Far probably is he yet from being convinced that every animal, every plant, and every inch of surface on his farm requires, receives, and constantly sustains the same degree of pressure from the same vehicle, loaded with similar nutriment, and every condiment essential to animal and vegetable life; while also, and conjointly, the elements themselves, in great proportion, sit down, *pro tempore*, with them, and each take share in the constitution of every animal and plant. In every measure of his dry pease, for instance, he may assure himself is contained and compounded one-third of the same of the air he breathes, *i. e.* not only in substance but in weight; and whence we may suppose the great advantage always deriving to their growth in gardens from being lifted up on sticks, and to which they have, by means of their clasps or tendrils, in themselves the strongest propensity; and in fields, from being planted in rows, and kept well hoed, earthed up, and cleared of every obstruction to a circulation of air between them.

The agency of water in the formation of vegetables is now well understood, inasmuch as it absorbs from the atmosphere carbonic acid gas, oxygen gas, &c. and conveying them, with all other essentials deposited in the soil for the purpose, into the constitutions of plants, and there becoming decomposed, sits down in part with them.

In ordinary wood is found one-fourth of its weight of *water*; and even in the oldest, having lain in buildings for ages, never less than a sixth. Its wood, or fibrous matter, seldom amounts to more than about four-tenths.

While many of the ancients (viz. Thales, Bacon, Van Helmont, and others) pronounced water as a simple element to be *the* food of plants, and modern chemistry has proved it a compound,* made of fifteen parts hydrogen, and eighty-five oxygen, with their fluidity preserved by caloric; such water, now better understood, carrying into the substance of plants whatever may have been stored up for them, either by art or nature, in the earth, becomes there decomposed, and while the plants draw and attach its hydrogen to their substance, they, with the aid of light, restore in part its oxygen to the atmosphere for animal respiration, and also for replenishing the soil, when exhausted by vegetation; and for which latter, as was discovered by Dr. Ingenhouz, it has the strongest affinity to it. It was also ascertained by the Doctor, that such affinity is by far more powerful in fertile than in barren soils; in a moist rather than in a dry state, in a pulverized than in a compact one, and in hot weather than in cold. And wherein is seen not only one immediate cause of the

* "No *one* principle" (says Sir H. Davy) "affords the pabulum of vegetable life; it is neither charcoal, nor hydrogen, nor azote, nor oxygen *alone*, but all of them together, in various states, and various combinations,"

superior fertility of rich soils, with also the effects of ploughing, hoeing, and pulverization, by whatever mode ; but also nearly a confirmation of the validity of Saussure's discovery, of the atmosphere not giving up its treasures to original elementary earth in a nude state ; nor unless it has something organic, as in vegetable and animal manures, combined with it.

If the agriculturist can assent to the position, that the atmosphere is the elaboratory for the preparing of vegetable food, and from whence it must be derived by nature, and *may be by art*, he will also perceive the necessity of having something more in view in manufacturing the soil than a mere turning it upside down, without a regard to season, circumstance, or design. It will be at once obvious to him, that if any particular form given to its surface; if any apt or more suitable manure, or superinduction of an opposite earth, ~~is~~ being applied to it; if any conjunction of the two, or the employing either or both at any particular season, be discernibly preferable; that it must afford him great satisfaction, if by exercising his understanding he can succeed therein to his wishes.

Whatever be the food of plants, (occasioning, through all ages, till chemistry was better known, much idle disputation,) Dr. Priestley demonstrated that, as well as in earth, it subsists in both air and water. That the air resigns it immediately from itself to the support of vegetables is evident, from

their purifying it when loaded with putrid exhalations; and that water is designed by nature to be an instrument of conveyance for it to the support of vegetables, is determinate from its collecting the sceptic or putrid properties from air, and carrying them into their substance, and from whence (as was discovered by Du Hamel) it passes off through their pores unloaded, and nothing but phlegm. That organic or vegetable earth has however a greater affinity to, or power for collecting, the foods of plants, than either water or air, is certain, in that as water under a receiver will absorb all putrid properties from the most foul air therein above it, so the earth will always attract them from both; and wherever water irrigates its surface, in proportion to the quantity of putrid matter it may contain, become fertilized thereby.*

* When it was first discovered by Dr. Priestley, that the whole of the vegetable and animal systems throughout creation are made for, and at all times reciprocally receiving aid and support from, each other; the glorious instance of perfection in the works of the Deity was nobly hailed, and finely expatiated on by the then president of the Royal Society, Sir John Pringle; and which has since been confirmed and further enlarged on by others, particularly by Sir Humphry Davy. As a trivial instance of the superior powers of attraction, or hunger, (if the expression may be allowed) in the earth for putrid animal matter for the immediate support of vegetation, the writer once, in the winter season, killed a sheep of an extraordinary size and fatness; and expecting a visit from a noted breeder, hung a leg of it for his entertainment; (a provision for garrulity, probably, as well as mastication.) His friend not arriving in due time, it hung for six weeks, and then became so putrid as to be scarcely fit food for dogs. He, however, experi-

Nitre beds, from whence gunpowder, whose active principle probably no one will deny, are formed by laying in heaps the refuse of animal and vegetable matters, mixed with old mortar, chalk, &c. covered on top with earth, but open on the sides. However, as crude nitre is not found to be a food of plants, if lime be not employed, no such nitre will be formed; and the animal and vegetable refuse in dung covered up in ridges, in a manner in the sequel provided for, and recommended, imbibing from the ingress of caloric drawn from a surrounding warmer atmosphere, and assimilating, when thus decomposed, its other properties in charge, viz. nitrogen, oxygen,* &c.

mentally pinned a cloth round it, and buried it in a *fertile vegetable* mould, a foot under the surface. Having lain about forty-eight hours, it was taken up with a worse smell than before: it was now, however, *musky*, and without aught of sensible *putridity*. He then threw it into a pond of water, (luckily on the spot, otherwise the discovery had been lost,) where remaining about two hours, it was taken out *perfectly sweet*. He immediately had it boiled in a large quantity of water; and now declares that he never, at any time, before or since, ate any mutton that for excellence might be compared with it: the earth having completely drawn off, even from the internal part of the joint, every particle that had been released in the process of its decay.

* Dr. Ingenhouz recommends as manures those substances yielding most carbon, as with the oxygen and caloric of the atmosphere, he says, they would form carbonic acid gas the food of plants; and which no process in nature but vegetation will decompose or destroy. Saussure observes of oxygen, that it is absorbed by mould formed of decomposed and decomposing *organic* substances; and that such mould contains a greater proportion of carbon than belongs to the plants from which it proceeds; and that the superabundance depends on the consumption of oxygen and hydrogen in the formation of water.

secure therein, and in like manner the object of our pursuit, and of universal sustentation, *i. e.* fertilizing properties for our mother earth, and from whose dugs, during our stay with her, we must be content to draw, in common with all the animal world, our chief sustenance and accommodation.

It was observed by Dr. Home, “ that all plants “ grow very fast after rains ; not only the terrestrial, “ but the aquatic. The latter,” he observes, “ can “ never be supposed to want water ; so that this “ effect must proceed from some other cause than “ the increase of nourishment by the roots. The “ same effect is observed to happen when the sky, “ from being clear, grows cloudy and stormy.” And as a further illustration, indeed proof of the position, the plant *epidendron*, from Java, derives its nourishment *wholly* from surrounding air, requiring neither *earth* nor water more than it selects from the circumambient fluid; while, however, were it analyzed, there is not a doubt but that both would be found in its constitution.

Were twenty tons of gunpowder to come in contact with a spark of ignited matter, the whole would instantly disappear ; whilst in reality a particle of it would not be annihilated, but invisibly elaborated in the atmosphere would quickly return for the support of vegetation, and thence of the animal world.

That an accretion of solid substance, and one of the most essential as a vegetable food, may be

gathered from the atmosphere, is inferible from that in the conversion of an hundred weight of lead to calces for forming a glazing for pottery; the mass will in a few hours, during the operation, imbibe *from surrounding air* ten pounds of *oxigen gas*, the constituent principle of their acid and saccharine properties. "Chemistry, indeed," (says Dr. Wilkinson,) "teaches us that two airs may be mixed together, and either a solid or a liquid may be formed. Two liquids may form a solid, and two solids may form either a liquid or an aëriiform fluid. In all these processes there is no new principle created; the varied conditions arise from the different arrangement of the same constituent materials."

Probably the advantages to be derived to an agriculturist, (never having considered the subject,) from some knowledge of the above transmutations of the elements, may be gathered from a matter frequently under his eye, in the process of making mortar for his buildings.

If he will take any quantity of quicklime, and something more than a quarter of its weight of water, and therewith make a wash, and afterwards throw gradually into, and work up therewith, and repeatedly, during several days, three times as much of pure and thoroughly well-washed sand as of lime; they will form either a cement for his buildings, or a stucco for his house, inside or out, as hard as stone,

impervious to air, and indestructible by time ; as the longer they stand, the more hard and stone-like will they become. Herein the water giving up its caloric, or hidden fire, becomes solidified, and forms a part of this mortar or incipient stone ; whilst the fire that kept it in a fluid state may be afterwards propagated, and employed for roasting his meat, or any culinary or other purpose. Nor will he, it is presumed, conclude otherwise, from the circumstance of water being generally employed for the most sudden extinction of fire. Informing a thresher, on a certain occasion, of the *antipodes*, that they walk with their feet towards ours, and their heads in a direct line from us, apparently downwards, the honest fellow positively denied it, peremptorily insisting on its impossibility, because, in such case, the water must all run out of their pools. It is to be observed, that in forming the above cement, *a third only* of lime will crystallize on the superficies of the sands ; and that the crystallizing matter, while *in a fluid state*, coalescing, will constitute a bond of union through the whole ; whilst *more* lime than the sand could thus take up, interposing between its particles, would break the continuity.

Lastly, and as another instance of the repletion of the atmosphere with all the components of solids, to the utmost extent, diffused in a gaseous form, the meteoric stones, not unfrequently witnessed to have descended fiery hot, and with a violent hissing and

immense force, to generally considerable depths below the surface of the earth, is an immediate and indelible proof and display. These stones, (frequently of several hundred weight) wherever falling, are found, on being analyzed, to be composed of nearly the same materials; and which, held in solution in the atmosphere by its caloric, are suddenly, from the desertion of the latter, (generally attended with a corruscation of lightning,) left to the force of their own mutual attractions and affinity; whence flying together with inconceivable force, and forming a solid of the greatest density; gravitation in her turn takes hold of it, and brings it to the earth with the celerity described; at one instant, a gas or dispersed vapour, of the utmost rarity, levity, and imperceptibility; in the next, a tangible substance, of the greatest density and weight.*

Herein is not only seen a display of Divine power, but even the *auditory faculties* of probably certain agriculturists, having never before considered the subject, may be arrested, and their minds compelled

* We have a catalogue of showers of stones, and other large masses, having fallen to the earth, (by Bigot de Morogues, of the Mineralogical Society of Jena,) brought down from the earliest ages; and wherein are recorded no less than one hundred and ten instances of the same, with also six instances of dust, flints, red sand, *balls of earth, fused metal*, &c. and seventeen of showers and masses of iron. On the 23d of September 1773, there fell at Skara, in the province of East-Gothland, an electric rain, wherein each drop, as it fell to the ground, threw out fire; and had it happened in the night, the whole district must have been in flames.

to witness and adore it ; a power constantly employed in taking man's effete refuse and corrupt materials from off his hands, and presently returning them neutralized, renovated, and refined, for the support of vegetation, animation, and, if he disdains not to attend to it, his own and all human sustenance and accommodation. At the present instant, in a paper of the day before me, is the following account : " A shower of stones from a *thunder cloud* fell on " the 10th ult." (September 1813,) " at Adair in " Limerick ; several of them *weigh* from one to four " pounds, black outside, extremely *heavy*," &c. &c.

As the writer considers himself to have been somewhat diffuse in his account of atmospherical possessions, he hopes the agriculturist, having a more intimate knowledge of them, will judge favourably of a design in endeavouring to inform *him who has not*, of his having, however, unknown to himself, a bank of wealth therein ; from which, being furnished with proper checks, he may occasionally draw whatever may be requisite in furnishing himself and his contemporaries with all that is really necessary in life, and for whose superfluities only we are daily depriving ourselves of its accommodations ; and for which so much blood has been latterly spilt, and is even now spilling.

And although, as long as men are merely men, little hope can be entertained of consistency in all their proceedings ; yet surely, if we profess to lose

light of our distinguishing characteristic, reason, the only medium of Divine light set up in our minds, and imperceptible by us in the creation, we shall have nought left as a counterbalance to a commensurately stronger propensity therein to error likewise, than can be elsewhere found.—As before hinted at, it was a valuable discovery, in the present age, of the younger Saussure, and which was afterwards confirmed by the experiments of Bertholet and others, that oxygen (that almost universal agent in the operations of nature) is absorbed from the atmosphere only by mould formed of *decomposed and decomposing, organic, substances*; while *pure, original, elemental earth*, he asserts, *has not* that power; and further observes, that the vegetable or organic earth is found to contain a greater proportion of carbon, than belongs to the plants from which it proceeds.

From this discovery is seen the necessity for replenishing pure original earth with all the recrements and decaying substances of both the animal and vegetable kingdoms; such only having access and affinity to, and associating with, the properties of the great universal laboratory, the atmosphere. For as in the commercial world riches gain riches, so these materials gain from air what other earths, not so imbued, are incapable of doing. From hence it is obvious that vegetable and animal manures have a threefold effect; first, as the mould composed by their decay, in contradistinction to that styled pure,

original, or elementary earth, contains in itself, more or less, the vegetable pabula; secondly, as from frequently agitating it, by ploughing, hoeing, harrowing, &c. the parts brought uppermost and exposed to light, the heat of the sun, and weight of an atmosphere loaded with all the materials of fertilization, become saturated therewith; while other parts may afterwards continue to be in like manner laid open for similar impregnations, till all become replenished; and thirdly, as they furnish crude elementary earths with similar powers; and whereby, as an indication of their thus acquired fertility, they all ever assume a darker colour. Hence it appears that the fallowists, and antifallowists, from a desire rather of obtaining the victory than a knowledge of truth, have long been treating each other only with invidious and declamatory reproach; the only matter worthy of dispute being, whether or not the soil, from the benefit it receives from a fallow through the course of a summer, will, during a routine of four, five, or six years continuance afterwards, reimburse the loss of a crop; the negative of which only will, I believe, where accurate accounts are kept of both, obtain practical confirmation; as by effectual drilling and hoeing, a fallow may be obtained for the benefit of the immediate, as well as for future crops; while (judiciously chosen) the decayed roots and recrements of a preceding one will form in the soil a manure for some other in succession; as turnips

prepare for barley, beans or clover for wheat, and on suitable soils, pease or potatoes for either.

Not but that clays, loams, &c. commensurately with the portions of alumine or argillaceous matter they contain, benefit to the utmost by exposure to light, air, and the solar rays; the latter effecting on them a gradual incineration, increasing with the time (particularly if frequently agitated) they lie exposed thereto; as oyster-shells having lain a length of time on the hot sands of the sea shore, are often found as perfectly calcined by the sun, as they would have been in a shorter by means of culinary fire. “Shew “a clay the sun,” (the old experienced farmer will advise you,) “and it will repay you for your trouble.”

As the benefit clays thus receive from exposure is particularly marked by their deepened colour; and as after obtaining either a wet or a dry state they are known, in proportion to their aluminous or argillaceous contents, to continue longer in either than other lands, it may not be presuming too far to suppose they are equally retentive of *thermogen*, caloric, or, in whatever form, the matter or principle of heat; and which, from its known powers of repulsion, separating universally the particles of matter, will very satisfactorily account for the superior and long-continued fertility of clays, when having for a length of time been exposed to the sun, they are afterwards by surface and under draining carefully kept dry; as water surrounding their particles,

and thus preserving their cold or low temperature, as clearly develops the cause of their inaction and consequent infertility when left to themselves.

On the contrary, if light spongy soils, of coarse asperous particles, and without a sufficiency of vegetable earth as a gluten or cement to preserve a continuity between them, be repeatedly ploughed during the heats of the summer months, and they have thereby taken in a superabundant quantity of these repulsive properties, their small portion of such gluten will afterwards be insufficient for preventing such particles from separation; and when, analogous to a dissolution or broken crassis of the blood in the animal system, where the latter is curable, they will be generally longer before they re-unite; and as soils *before too dense* and heavy are hereby amended in being made *lighter*, these *too light before* are by the same means *made worse*. A plentiful dressing, however, of marl, chalk, pond mud, or a compost made of genial clay, previously well limed, or rich loamy earth, with a sufficiency of dung to secure together a crop of turnips, and to induce the capillary fibres of the latter in search of it to insinuate and distribute themselves through the whole of the soil, and these in their decay furnishing mucilage *under*, together with the soiling and treading of animals consuming their bulbs *on* the surface, will probably be found effectual for the purpose.

Admitting these positions as data, we have in them a clue, I hope, for finding a more rational *theory* than many latterly promulged, or any, I believe, *practised* on different principles.

Although it is obvious that plants on the surface, particularly those in any degree tap-rooted, sending such roots down into the stratum immediately below the track of the plough, must there leave abundantly their decaying fibres, recrements, and taint, (the dispersing of which is one of the two great motives for turning with ploughs, and opening to the air, the surface mould above it;) and although it is equally obvious that other recrements from such surface mould must be carried down thereto by the percolation and washing of rains, probably for years or ages; yet still continues the almost universal mode of ploughing lands *always at the same depth*; while the *substratum*, in equal and generally greater want of depuration, is precluded from its advantages, together with all those of fallowing in aëration, insolation, &c. &c.; and while, were not only such loaded stratum, but even another of dead earth under it, brought up by means of proper ploughs, the first, replete with vegetable earth, would at once display immediate fertility, and also eagerly attract its principles from the atmosphere; and the under stratum of pure elementary earth, at first, according to Saussure, incapable of so doing, might soon be furnished with an appropriate power for the same, by being reple-

nished with vegetable and animal manures, and thence brought into intercourse with the atmosphere, by growing such vegetables as would, through their tubular vessels as channels of conveyance, appear to be most adequate to keeping it up ; particularly, potatoes, turnips, red clover, beans, &c. &c.

It has been conjectured, that from improper management during wet weather, in time of harvest, together with the depredations of birds and vermin, a fourth of the produce of the British lands is, on an average, annually lost to the community; and if to these we add those of weeds in general; and loss from a neglect of the row culture, (whereby not only in substituting them with better products, but also as these products would be greatly enlarged by a garden-like treatment,) we may moderately estimate on a loss in the whole of a third; if not more; and which observably prevailed during an exigence, when we could expend ten millions in a year for foreign corn, and ten millions more barely to keep our poor alive, without once adverting to the subject!

As, however, from the perseverance of our worthy president, Sir Benjamin Hobhouse, parliamentary fees have been so far lowered, that the inclosure of our wastes now goes on in a way much more accelerated than had been ever suffered before, and we have hopes that the matter begins to have more permanent hold on the attention of the human mind; we may begin to gather some ground too

for hope that the *means whereby* it may be directed on principles of science and rationality, will be also more consistently attended to.

Description of a Splitting Plough.

This instrument having been constructed for various purposes of fertilization, now more than twenty-five years since, it was afterwards employed by the inventor during many ensuing seasons with constant and unequivocal success. As an account of it, together with that of a Land-roller, were the cause and intended themes of the present Essay, probably a more circumstantial and satisfactory detail cannot be given of it than by means of a short narration of its origin.

Coming into possession, a little before the above period, of an extensive kitchen garden, having a small declivity, and a large pond of water at a short distance above its level, the writer observed a spot of some extent in the centre of it to be constantly stocked with very luxuriant coltsfoot (*tussilago*) only; and that whatever was planted there, nothing could stand in competition with it. He had also before, on many occasions, observed the gardener never to sink his spade in digging the spot more than about three

inches, because, forsooth, of a substratum of till or orange-coloured earth, a ferruginous loam, that he always pronounced, “if fetched up, would be *poison*.” The writer himself, taking the matter into consideration, immediately drove a drain along the top of the garden, at a depth sufficient to cut off a supply of water from the pond above it, and threw the said orange-coloured earth into the form of celery beds, as represented in the preceding section, plate 1, fig. 3. The bottoms of the intervals *d, d, d*, were then, after a frost, thinly covered with some raw stable dung; the ridges reversed; and the new-made intervals where they stood were in like manner, after a frost, covered with dung. Succeeding frosts having gone through these subsequent ridges, a little earth was then raked down on the dung in their intervals; and the latter, at a proper season, planted with a single row of potatoes along their centres. As the plants came up and advanced in their growth, earth was constantly given them from their adjoining ridges, till even new ridges were again formed on the late intervals in banking them up. The plants were of a most luxuriant cast, and their produce in bulbs enormous, *i. e.* in a proportion of 183 sacks, of 240 pounds each, to an acre.

The earth was afterwards dug up, and thoroughly mixed to a double depth, and ever after continued abundantly productive of whatever species were committed to it; carrots in particular drawn from

it were of a more extended length and diameter than any he had ever witnessed before; insomuch that he thinks it may be prudent to forbear giving here their dimensions.

Ruminating on so unexpected an effect, the question soon after naturally presented itself, "May not the whole or at least the most eligible parts of a *farm* partake, in a relative degree, of the advantages thus displayed in the *garden*?" A plough was then immediately constructed for the purpose, with timbers of oak, and which, now in being, is little the worse for wear; nor has it been since necessary to attempt therein any material emendation. From its effects early perceived, another of similar construction was the next year procured, and a substratum of upwards of five hundred acres, having been never before exposed to light, heat, frost, or air, (all great fertilizers,) was soon laid open to the influences of them all; and after a few years, though not equal to the garden, thereby greatly improved.

Its first effect being, however, to bring into life as indescribable a host of enemies from seeds of weeds (a deposit of years, indeed of ages) as ever resulted from listlessness and inattention, it was found necessary to confine the culture for a while to lands only intended for crops that might, during their growth, partake of ample, repeated, and effectual hoeing; and which duly given, soon exterminated the whole of their generations root and branch.

Even charlock, that almost universal favourite and *natural production of the soil, as often termed*, was no longer suffered to decorate the fields of barley in the spring, frequently destructive of near half the growing crop, and shedding a stock of seeds sufficient for at least twenty more succeeding. For by the too general mode of ploughing *always at the same depth*, and frequently without regard to an immense crop of the seeds of this depredator having been shed in such fields before harvest, turning the whole in by an ill-timed autumnal fallow, if by a succeeding one in the spring the plough should bring up only one in five of the deposit (very probably not more) of these seeds, leaving four for as many spring ploughings to come, their plants will soon, in golden trim, afford decoration quite sufficient, with the aid of a favouring declivity, for being seen at twenty miles distance, and to add to the above deposit of four seeds some hundreds more in their season; and whence by a continuance of the system might the stock continue to increase, till vegetation would be even almost at a stand. Should the writer be here thought too quaint in his account of charlock, he can only, after proper exceptions, appeal for justification to the colour yet observable, in the months of May and June, of barley fields at large. Respecting the voracity of the plant in engrossing all vegetable nutriment within its reach to itself, we need not probably appeal to any thing more than mere observation.

Virgil's account of it, of now near two thousand years standing, is that it burns the land. And it ought to be universally known, that an experimentalist, recently trying what would be the result of even hand-drawing a multitudinous crop of these and other weeds from his corn, compared with an equal extent not so treated, he was more than amply repaid his expense by the more abundant crop *itself* from which they had been taken.

For the purpose of first divesting lands at large of all weeds and their seeds, for ages, more or less, locked up in them; and at the same time most appropriately adjusting and disposing them for imbibing and retaining the prepared and abundant riches of the atmosphere, (the writer having no idea of aught besides that can in the least be compared with its operations;) is given the representation of an instrument for turning up the soil, with the aid of six or eight horses, to any required depth, from six to eighteen inches, more or less, and throwing it into ridges in the form of celery beds in a garden.

It may here probably occur to the reader that there are other ploughs apparently calculated for similar purposes; while it has not, however, been found that any of them are effective in *splitting* ridges of great indefinite sizes and depth, and thereby exposing *the whole* of a soil, two or three furrows deep, to light, sun, air, and frost; and thus completely disjoining their particles, to depurate and divest them

of all taint, roots, and recrements^d of antecedent plants; to bring up and destroy seeds of weeds, the accumulation of ages; to prepare the substrata for associating (in conformity to Saussure's discovery before related, p. 338) animal and vegetable manures, and thereby, as the only practicable means, to make them join with surface mould, and thus in future to furnish an increased power for collecting, as well as an enlarged recipient for containing, *greater quantities* of vegetable pabula constantly preparing in and precipitating from the atmosphere. How often may we trace in an arable field the foundation of some ancient abode, passed over to and fro for ages by the plough, and almost always contiguous, a spot of whilom garden ground, of superior and undiminished fertility, only from its having been, when so appropriated, deeper dug, and its quantity of mould fertilized by its intercourse with the atmosphere, having been thereby increased.

There are many instruments styled double ploughs, double-breasted ploughs, double-furrow ploughs, double mould board ploughs, &c. &c. (terms equally indefinite, inasmuch as they will either of them as properly apply to any *other* plough having two shares,) while this, having in a prior operation accurately disposed a field in ridges of from three feet, with their intervals, to three feet and a half; by a second, in the most complete manner *splits* and turns them into the former intervals; and thus forming new

ones intermediate, and thereby alternately exposing *the whole of a substratum* to the above-mentioned influences *never laid open to them before*, it has derivatively obtained the legitimate term, *splitting plough*.

It is also, by occasionally adapting an old narrowed share, equally well calculated for forming and clearing out water-furrows, and also pulverising the intervals and earthing up rowed crops, viz. potatoes, cabbages, &c. &c. having the only permanent, appropriate, and effectual power probably yet seen for jointly elevating and expanding, and thence only adapting its mould-boards to *any form* required for such purposes.

As it is a matter of general and just complaint, wherever superinductions of different earths are had recourse to for fertilization, as sands for clays, and, *vice versa*, the heavier will, in a course of years, generally subside and separate from the lighter, and form a stratum by itself at a depth indefinitely below the surface; the plough here described is particularly calculated not only for fetching up such stratum, but in a singular and most complete manner re-mixing it with its superincumbent mould; and when will recommence an action in the mixture, even by the very work of its heavier part again so subsiding, probably not unfavourable to vegetation; and which, before its completion, will again, preparatory to its fallow crop, (viz. turnips, potatoes, &c.) be so brought

up, and re-mixed for the different appropriations of another routine.

It may be naturally conjectured that the system of fallowing here recommended will stand opposed to Mr. Gregg's surface culture, now so generally approved; it may properly, however, be understood to be quite otherwise, and as signally calculated for supporting and promoting it. For as during the course of every routine, its constituting and intermediate crops ought to be all different from each other; so will the roots and recrements of each (instead of being injurious) serve as a pabulum and support of all the others throughout its continuance. When again, as preparatory to its fallow crop, our plough will fetch up, expose, and thus divest the soil of them all: one of the two great motives for fallowing being to cleanse the soil of whatever recrements any particular crop having ejected and thrown off as deleterious to its species, are necessarily left perdue in the soil; but which, though poison to the species itself, will nevertheless be probably found wholesome and nutritive* to most or all others,

* If, as asserted by the late discerning Dr. Fordyce, plants feed on a mucilage formed by the roots of prior vegetables having decayed in soils, there will be found few particles in those where turnips may have been judiciously cultivated, between which their filaments or capillary fibres will not have insinuated themselves, and where necessarily left, they must afford such mucilage in great abundance. That these fibres often extend to four and even six feet from the bulb, may be known by examining any lump of dung lying casually thus distantly situated from a large single turnip;

though not in all cases alike; papillary and leguminous crops being universally known to be very superior as preparatives for culmiferous ones; as are also all broad-leaved plants, drawing in great measure their support from the atmosphere,

Figure 1, Plate 1,

Is a plan or bird's-eye view of the plough in its work; wherein, some time in autumn, a first furrow supposed to have been formed and to lie under the ring *a*, at one end of the balance, fig. 2, and four horses at length for heavy work fastened to such ring, four more as a counterpoise are to be attached to the ring at *b* at the other; when moving on in parallel lines six feet apart, the plough will be drawn in a line three feet equidistant between them, and turning a plinth towards the furrow first formed on the right hand, the latter will there meet one thrown out to the left in making it, and thus complete a

and where no other can partake of it, the under side of such lump being usually covered by a tissue or web of such roots, which, although from their minuteness they will be scarcely perceptible, will, however, from their numbers form a congeries or plexus almost as close and white as a sheet of unwritten paper; and whence is apparent the necessity for separating, by both culture and manuring, the particles of soils preparatorily for turnips, for the general ramification and induction of their fibrous roots, as, after its culture, the earth at comparatively no expense is made to enrich itself from the atmosphere. The matter, indeed, speaks for itself, and needs no further comment or recommendation.

ridge. At the same time turning another plinth to the left, to be met by one from the left-hand side of the plough on its return, in like manner will be formed another ridge; and thus the two teams continuing to work alternately, one in the last-made furrow, and the other on the unploughed land, will they at every bout or return complete in parallel lines six feet of ground, and consequently, in travelling a journey of eleven miles, four acres. Should ridges be required of larger size, the rings of the balance may be adjusted appropriately in the holes nearer their ends, and whereby, together with their intervals, they may be extended to three feet and a half, or seven feet at a bout. To keep the teams at their proper distance from each other, a spreader made from the handle of an old corn-rake, or other like-sized rod, of either six feet or six feet six in length, may be tied with leather thongs to the bits of the fore-horses' bridles; while the driver (otherwise constantly walking between the two teams) will have only to move in and out from them at land's ends.

To describe a preceding operation in carrying improvement at once to its proper height; after the earliest hard frost has sent its lacerating powers through the ridges, (*r, r, c*, fig 3,) and also to a good depth into the bottoms of their intervals (*d, d, d*), never exposed to frost, sun, or aerial influences before; let them, the intervals, receive a covering of some raw animal manure, viz. yard or stable dung;

à la Sauffure, (as I hope, with a view to consequences of the first importance, I may be allowed to broach a new phrase, and which I further hope may be hereafter universally understood, and where practicable, as universally and as properly applied,) Then, immediately, preparatory to a second frost, let the same number of horses be fastened to the shorter balance, (fig. 4.) and proceeding to two adjoining intervals split every alternate ridge immediately between them, and thereby throwing off a plinth on each side of it into the intervals and upon the dung. The field thus gone over, let the horses be again attached to the longer balance, (fig. 2.) and there-with moving along the alternate intervals, yet open, draw the plough between them, and split the reciprocal or remaining ridges left in the preceding operation; when another hard frost having taken place, let dung, as before, cover the new-made intervals, and bush-hurdles be drawn obliquely across the ridges, barely to bury it with mould between them.

With a view to a thorough extermination of what may be depended on, an unprecedented crop of weeds from a dépôt of seeds, for years and ages in accumulation, under the uniform track of former ploughs, we will suppose the field designed for some hoeing crop to be planted in rows, and ploughed between by the Tullian mode. If a clay, the drum-head, or some other kind of cabbage, may be most eligible; and if not too compact and heavy, turnips

or potatoes. Suppose the latter; and after the genial influence of spring may have started all the seeds near the superficies of the ridges and intervals within its power; let the bush-hurdles, about the beginning of March, be again drawn lengthways to remove them, and the early golden dun potatoe be set accurately by line in rows along the intervals eight inches from each other, and the rows of course a yard apart.

As the plants appear, and as soon as of a sufficient height, let them be hand-hoed, and afterwards repeatedly horse-hoed, as weather and other incidents may point out; taking care, however, when the plants are grown to a good height, and by as many operations as may be deemed necessary, to bank up the rows with the splitting plough, (one of less size, and on the construction of the Beverstone plough, would be preferable,) having its mould-boards accurately adjusted, and the horses moving *tandem* between them. For this, as before observed, these ploughs have singular and appropriate powers of regulation.

As with an eye thereto throughout the process, these early potatoes may be removed by the latter end of June, either the great Scotch cabbage, the broad Battersea ditto, the Lapland, or the Swedish turnip, may be brought immediately from a seed-bed, and, with a moral certainty of success in their growth, be made to supply their places; the earth being in the best state possible to receive them.

Were it not that it would require another drawing of an appropriate plough for finishing the process, I would recommend the large red and white pied potatoe, or rather the black pomegranate ditto, (both late sorts,) to be planted at the beginning of June between the rows of the golden duns; as after being once hand-hoed, the taking up the latter would afford them a further timely and effectual dressing: to a complete performance of this work the new plough would, however, be necessary. By thus using the *very earliest and very latest potatoes only*, the writer has obtained as complete crops of both in a season, as if the ground had been solely appropriated to either of them.

The proprietor, after having enjoyed for a while the probable effects of his industry in the most beautiful luxuriance of growth ever seen, will still have in view the germination and destruction of weeds, and further benefiting his new mould, (*now rapable, à la Saussure*, of receiving it,) by exposure to the atmosphere, even in the taking up of his crop, (*i. e.* of golden duns alone;) and which may be expeditiously and effectually done, by removing the coulter from the same instrument, and with four horses in the manner before directed for eight, opening the ridges alternately for the purpose, and employing thirty or forty men, women, and children, to gather, sack, and carry off the crop.

Respecting lands with a rubbly rock within four or five inches of the surface, should a renter of such, liable to be turned out at six months notice, quaintly ask the writer, "if he would seriously recommend *à la mode so sure* for *his* routine?" He, the said writer, could only quite as seriously inform him, that if he could possibly think so meanly of the renter's understanding as to regard it, he would have poor hopes indeed of his ever *benefiting by recommendations of any kind*. If the said renter, with his landlord, in serious council, may not be apprehensive of *gross error* in longer keeping each other at bay, and they will not *both together* more wisely, while in their power, put their shoulders to the wheel of improvement's car; why then the said car must remain in the same slough it has for ages past, and till some *wiser generation* may attend to common sense, and even lift it out.*

• There has latterly, however, appeared some glimmering emanations of light in the case; some trivial essays of rationality in removing rubbly stones near the surface from certain fields contiguous to turnpike-roads, (being there an article of sale,) to a depth of ten or twelve inches, more or less, and obtaining thereby a sufficiency of ploughable matter, as a recipient or repository for animal manures employed for gathering vegetable pabula from the atmosphere; and if legislative interposition could someway contrive to countenance and extend the practice, (in China, or even near Edinburgh, it would not be long about,) it would soon have the most desirable effects, not only by increasing the necessary products of the earth, but also in perfecting the roads wisely projected and prosecuted (execution apart) by that power, for a facility of their removal, together with all matters of commerce, from place to place.

With regard to mechanical practicability, (as the writer now considers himself purely on mechanical ground,) he will at present go no further than to

Possibly from the same resource new roads might in many such situations be judiciously formed, by shortening distances, winding hills, equalizing elevations, acclivities, &c. &c. in more eligible directions; and when in direct opposition to the mode that at first, from want of experience, absurdly prevailed, *all* earth might be removed from their areas, and, stones being brought for their formation, taken away in back carriage for further deepening the soil producing them. And whence such road, (being wisely built on a rock instead of a sand as at first,) would, in defiance of winds and storms, endure comparatively for ever; no stones from pressure of ponderous vehicles would then be seen sinking into earth below; no earth seen rising from below to the top of the road between the stones; and both for the best of all reasons, *no* earth for either effect would there be found. The measure would, in either case, be only consistently following up what was so wisely projected about sixty years since, and wherein were found the means, and when commenced a system of intercourse throughout the empire, convenience, prosperity, and wealth, that having since gone on increasing to nearly the present period, begins now to menace a falling off, from vehicles of conveyance having become so numerous, and some of them so heavy, that the roads sink under them; while in many districts the traveller is taxed to extortion, only to discharge the interest of debts already incurred and regularly accumulating; and the reparations of the roads are most tyrannically imposed on its farmers, because, forsooth, they have the convenience of horses and carts,—carts, whose wheels in exigencies of the state (although its *primum mobile*) it has hitherto been customary, and deemed political to clog. As, however, whatever respect custom may have gained, or approval the measure may have conciliated, the cart is still clearly seen herein before the horses; it will be right to hope, that it may ere long come under a more close and efficient examination; that the pillar of state, set on its only proper and permanent base, and *agriculture*, may regularly and majestically rise to its just and apposite height; nor any thing be afterwards seen to fall off or retrograde, that would therein have a tendency to over-

recommend to their serious contemplation the poor man's garden, mentioned page 295; and with respect to the duties of an individual in the case, (as he considers this not a place for defining *true* or *false* modesty,) he humbly hopes he may have discharged those of one, in having broached what has since (howsoever improperly) taken the name of Mole-Plough;* which, among many other useful purposes, was (more than thirty years since) frequently employed under his own eye, with the aid of eight or ten horses, more or less, in tearing up flaty rock within from five to eight or ten inches of the surface; and which it not only did, but its share, (in the Society's repository,) properly fitted up, would be still capable of doing with a facility and expedition incredible, he fears, were he to attempt the description: and when the stones were either carted away for any requisite purpose, or broken small with hammers, and left to deepen the soil.

As, however, without something practical too in what he has posted to the account of M. Saussure be brought forward in confirmation, the whole of the above may be considered as visionary, and not more than his mere *ipse dixit*; a fact of the day, in corroboration, may be here happily appealed to. A Gentleman in Warwickshire, to whom only at the commencement of the present year (1813) the writer sent one of the splitting ploughs under description,

* See vol. xi. of the Society's Papers, page 156.

now informs him, that having therewith immediately turned up fourteen acres of an alluvial soil, impoverished and filthy in the extreme, to twelve or fourteen inches depth, he gave it a proper dressing of manure, and in due season planted it with early potatoes; which being carefully and vigilantly attended to during their growth, did full credit to the measure, and were sold from 21l. to 29l. 10s. an acre in the ground, with a stipulation that they should be taken out and carried off in time for introducing in their room, from a provisional seed-bed, the Swedes turnip; and which having in due time taken place, and these being now in as great luxuriance of growth as they could possibly have been had not the potatoes preceded them, competently proves that (the expenses of the sets and their commitment apart) the whole of the potatoe crop was matter of clear profit, as all others of every description may be very impartially posted to the account of the subsequent crop of turnips; and than which, as a feat altogether in improvement, agriculture cannot probably at any time have boasted a greater.

Where it may not be necessary or practicable to let the plough lower than to an inch or two under the track of the common plough, and to fetch up seeds of weeds casually turned in by the latter; if preparatory thereto a coat of dung be evenly distributed over the surface before winter, it will in the ope-

ration be not only completely covered up in the middle of the ridges, but be there most advantageously situated for attracting and imbibing from the atmosphere all the principles and properties of fertilization, precisely in the way before spoken of for collecting nitre; and when after a frost or two the ridges are split and reversed, the dung will in the act be so minutely divided and curiously intermixed with the earth of the ridges, that it will be better to refer it to observation than to attempt to describe it: While, whatever specifically the soil so disposed, may gather from the atmosphere, whether nitre or the nitric acid only, carbon, oxygen, or ammonia, its complexion will be darkened thereby, and a property be acquired, whereby it will decompose, and obtain from the driest atmosphere *moisture (indispensable to vegetation)* throughout the ensuing summer. If the soil be not of too light and hollow a fabric, and spring corn (oats or barley) be committed thereto, it will be absolutely necessary that they be sown in drills, (and that, to keep down superabounding weeds, their intervals be incessantly hoed,) as their bulk will undoubtedly be so enormous, that without a strengthening of its straw, by giving it air in this mode near the ground, the crop will in every probability be not only all down, but be so entangled by winds from different points, that the mowing it will be attended with the greatest difficulty and delay. The writer has been repeatedly under a necessity of

giving 4s. an acre in this case ; when otherwise, as per custom of the day, the demand would have been only fourteen pence ; nor, as an improvement in culture, by a *single operation*, will it rank at all behind that of the potatoe and turnip crops before mentioned. Should stones be by these operations brought to the surface, they should be either immediately carted away for roads, drains, or boundaries, or industriously broken small with hammers ; when, if calcareous, they would attract from the atmosphere, and retain, the carbonic acid for the support of vegetation.

Some esculent crop should be, however, always preferred in this case, as cabbages, carrots, turnips, *potatoes*, parsnips, &c. ; and care be taken never to commit seeds of wheat, unless the new earth may have lain exposed at least through a winter and summer season ; nor even then, till after a clover ley, would it in some soils be eligible.

Figure 2. The longer *Balance*. A term legitimately assumed in lieu of a few of the vague incommunicable synonyms hitherto employed ; neither of which conveying more than a provincial or perhaps village idea, can be more than matter of mere inanity to a general reader. The motive for the term *balance* may be perceived not only in its legitimacy, but more satisfactorily, it is to be hoped, from a description of its use. Although others are employed in various ways on a similar principle, it is

in no wise improbable that many a proprietor of horses drawing at length, or in a team of four or more, one before another, may have been so for many years, without his once apprehending a matter necessary to be universally known, viz. that of two horses of *apparently* equal strength and disposition, one shall exert a much greater, and in some instances nearly double force to that of the other, as long as they may be employed together; and which may never be perceived, because the mode by which each contributes his share is as obscure as that of the milk of certain cows in a dairy promiscuously mixed with that of others, contributing nothing to a given weight of cheese; and which was not long since discovered by that learned, useful, and neglected friend of man, the late Dr. Anderson; who exhibited proofs that the produce of the lacteals of some of these animals will abound with more, some with less, and that that of others may not contain a particle of, caseous or coagulable matter, or what contributes to the substance of cheese. The different exertions of the two horses (probably consisting in great measure in habit, and acquired when first brought into harness) does not terminate in the mere immediate defect of either; as the consequences of the deceit being imposed on the other more honest, useful, and valuable animal, may probably send his carcase by so much the sooner to the kennel; while that of the other, covered with a sleek and glossy skin, will remain *an*

ornament to the team, and ready for a repetition of the performance on some other.

However, as it might not be thought eligible to prefer descendants from a cow whose milk would not make cheese, it might not be less impolitic to esteem the breed of a horse *from the above cause* sleek of skin, in preference to that of one disposed to lean against the collar; and as an effect of a due regard to blood in the animals is exemplified in our coaches, that were used to require three days before they could reach London from 'hence, and which now twirl up within twelve or fourteen hours, it might not be too soon would breeders begin to think of preferring the offspring of progenitors of the cart kind of horse, whose shoulders, as above, will have the strongest affinity to the collar: In Suffolk, we are told, a due regard is shewn to it; and we hope an idea of its necessity will soon become general.

The position admitted of a difference in the exertions and habits of these animals, a propriety will be seen in working colts, at least till their habits are confirmed, always in pairs; as each being fastened at the end of a *balance* at an equal distance with the other from its centre, it will be impossible for either to draw a pound more than its fellow; and as all of the species, even the most deceitful, have an aversion to being drawn backwards, and as this, when any two are so harnessed, will be a necessary consequence with either, in the act of the other moving forwards,

they will herein generally urge each other on to a sort of maximum pace, and which, *cæteris paribus*, will be in most cases greater than that of four moving tandem, or one behind another ; whilst *a habit* thus early acquired will be in a great degree continued through life. . Herein too very superior power may be obtained, by each horse having its separate balance in the same way, adapting itself to the alternate advance of its different shoulders ; while, however, as in instances where balances already applied for this purpose are frequently not adequately appreciated, and as a description of their advantages, together with those of an appropriate harness, would require a length too extended for an essay already protracted, the topic may be reserved for some future day ; and when so interesting and deserving a subject may, it is hoped, have some little justice done to it, and possibly some few remedies be brought forward for its present glaring defects. Still, however, in mercy to the bleeding shoulders of the wheel-horses of a coach and four, it may not be amiss, before we leave the subject, to contrast them with the sound ones of the fore horses, *entire from the use of these balances* ; and with a view (appealing to humanity) to suspend, if possible, the approaching barbarous fashion of subjecting the fore horses to similar torture by a *discontinuance* of these balances, rather than to attempt an emendation, howsoever easily obtained, for the backward ones!!

The well-known and indeed natural inattention of people generally employed in field culture, when often and necessarily moving from one process therein to another, in frequently leaving detached parts of harness on the most distant side of a farm, is such as will, it is presumed, induce every *practical farmer* to wish for some reformation in its construction : and from whence it may not be improper to intimate, that the peculiarities of the above-mentioned harness consist in a power, from merely unhooking and hooking its crooks, for its being at all times instantaneously detached *from*, and immediately attached *to*, any and every instrument, vehicle, or machine in use, *without a possibility for any part necessary to either being left elsewhere*, or separated from the whole ; and while it also, in all cases, affords much ease and great accession of power to animals drawing by an elevated line of traction, *i. e.* all machinery used in field culture.

Fig. 4. A short balance necessary for *splitting* the ridges measured out by the longer one in the prior operation, and to which the horses being attached as before to the latter, will each team find a roomy path in any two *adjoining* furrows, while the plough behind will *split* the ridge between them. They are, however, on their return, to leave the adjoining ridge untouched, and thus splitting every alternate one, to proceed through the field ; and when attaching the horses to the longer balance,

they may return and split the ridges left before ; and whereby, in this operation also, they will all have open broad paths to walk in, and without treading down again the earth turned up to frost, sun, and air ; and which, after the process, will be left wholly so, in the completest and most effectual of all fallowings hitherto known.

Fig. 5. A profile, or side view of the plough, as seen in the work of splitting the ridges formed by it in a prior operation ; and from which the instrument (considered to excel therein) derives its proper distinction and legitimate term, **SPLITTING-POUGH**. In this operation the wheels, as seen in the figure, are let down by means of the regulations at *c, c*, fig. 7, to the sub-surface or bottoms of the furrows *d, d*, fig. 3, between the intermediate ridges, and to a level with the bottom of its share ; and while in splitting those ridges, it forms new ones on the surface of their intervals, where for a while these had remained open, and for the first time exposed to the benefits of air, sun, frost, and light, and whereby, as the only possible means the writer has an idea of, the other half of the sub-surface where the former ridges stood, and never exposed before, will be in like manner laid open for the benefits of the atmosphere.

In the first formation of the ridges, while the share works at its proper depth *below*, the wheels with their frame are so raised as to move on the *upper* surface,

as at the line *f*, fig. 5; and are there fastened at the regulations *e*, *e*, fig. 7, while the trail *g*, figures 1 and 5, connected by a joint to a cross-bar of its regulators *k*, *k*, fig. 7, will remain to be afterwards and separately adjusted; the fore end of the tractor *b*, fig. 5, being also fastened to the same cross-bar: In the plate, the stock of the wheel is represented as being transparent for displaying them. The line *i*, fig. 5, represents the tops of the ridges *e*, *e*, fig. 3.

Fig. 6. Two curved or sweep bars *l*, *l*, riveted to the insides of the mould-boards. They are struck from the centres of motion of the latter, at the backward ends of the two elevated sides of the share; whilst another curved bar *m*, of similar radius, riveted to the hind part of the share, its receiver *n* takes in the two former at running mortices at its two ends, and the latter at one in the middle; where they are adjusted, and fastened by three small pins, tied with leather thongs.

In the peculiar mode of fastening, with small screws and nuts, the mould-boards to the share, consists the *desideratum* of giving them any requisite degree of either elevation or expansion; and by which they may be instantly adjusted to any point, for earthing up rows of corn or esculents of every kind; and which power is obtained by giving the share at its points of connection with these boards an elevation (midway between vertical and horizontal) of *forty-five degrees*, and whereby the boards will turn thereon

with sufficient effect, either in an horizontal or perpendicular direction, and consequently to any requisite point between them.

Fig. 7. The front of the fore carriage of the plough : which will probably need no further description than what may relate to the adapting its wheels to any required breadth of interval between ridges of land, or rows of corn or esculents ; and which is done with much facility by shifting the walvers on their axle to either side of the wheels, whereby may be obtained any graduated breadth, from seventeen to thirty-one inches ; generally of seventeen inches for forming ridges, and thirty-one for splitting them.

Description of a divided Land-Roller, &c.

Figure 1, Plate 2, is a profile or side view of a jointed land-roller ; preparatory to a description of which it may not be more than properly methodical to enquire, what are the *determinate operations* of rollers ; and for what *specific* purposes are or ought they to be employed ?

Herein I fear the evidence of the visual powers only has been hitherto consulted, while that from

speculative enquiry or deliberate investigation (as in the case of almost the whole of our agricultural machinery) has preposterously not been thought necessary to be called in, or even worthy of being attended to.

Our late exigencies, however, calling for a more serious attention to such matters; as the enquiries are not *more* than rational, answers to them of course ought not to be *less*; and which readily present themselves under the following heads.

First, the requisite, obvious, and certain effects of rollers on tillage lands, preparatory to a commitment of seeds thereto for fructification, is to break down, where necessary, and to reduce their clods to a state of comminution most fitly adapted to the progress of the tender fibres of their plants. While, under the

Second head, after seeds may have been sown, their application is intended, by again breaking down clods, and smoothing the surface of the soil, to prepare it for subsequent operations of the scythe and harvest rake; and further so to compress and bring into nearer proximity its loosened particles, (previously separated for the ramification of roots,) as to prevent aridity, or their becoming too dry from an admission of external air.

With respect, in the first case, viz. to the breaking of clods preparatory to sowing, the evidence of sight may be sufficient for decision; while under the

Second head, viz. the breaking them down, and smoothing the surface after sowing, preparatory to the operation of the scythe, &c. involves matter of a more abstruse nature, and of *real* though not as visible interest; and which to elicit may require some little further investigation.

From what, however, is apparent in the case, the most inattentive will probably allow that the soil, having received its seeds, may in *one* instance be so closely compressed by the action of a *too heavy* roller, as to render it impossible for the minute and delicate fibres of plants to ramify, or in any way insinuate themselves between its particles in search of food; and in *another*, that if a roller be *too light*, the particles of an arid and loose earth will not, by its pressure, be brought near enough together to keep out external air from their tender radicles and fibres; while its consequences, not so generally understood as they ought, will be often seen in a sickly state of the plants, and particularly so with those of barley, if, at the time the parent grain becomes exhausted of its milky nutriment, their roots may not have obtained sufficient hold on the soil. At this period (aptly termed their weaning) such roots become arid and parched, analogous to what the animal intestines (to which they are frequently and justly compared) would partake of in a similar situation, and their foliage will turn either of a white or yellow colour, and frequently disappear.

As an example of the effect of a *too great* pressure, an ancestor of the writer, in an occupation of more than two thousand acres of land, waited, on a certain occasion, through the whole of a spring sowing, for the coming home of a new wooden roller: it at last however arrived, full of sap, of large dimensions, and necessarily of a ponderous weight; it was nevertheless hurried over the whole of the newly-sown land; and which having accidentally, and prior to the operation, imbibed from the atmosphere more moisture than was congenial to it; the whole of the crop was thereby nearly lost, or, however, while those of the vicinity were superabundant in produce, this, from the weight of the roller and consequent density of the soil it had passed over, was at the consummation of harvest of a very inferior cast.

As from hence it is evident, that by the operations of rollers on newly-sown lands, these may, to the great injury of their produce, be either *too lightly* or *too closely* compressed, and that the external air being thereby too much or too little excluded, the roots and fibres of plants will, in either case, be obstructed or retarded in their search for food; it is necessarily deducible, that in the operations of rollers of eight, nine, or ten feet of *inflexible* length, *both* these defects, with their inevitable consequences, *must be* particularly involved; and which, howsoever new the idea, might in frequent instances, by means of a little of that shy unwilling thing *attention*, be seen in the

clearest light, and be afterwards as candidly and universally acknowledged.

While the generality of our agriculturists are coveting extreme length in these instruments, little are they aware that they incur loss thereby, not the less certain for being unperceived. Would any one, having never before considered the subject, when walking over his newly-sown lands, be curious enough to take in his hand a straight inflexible rod, of the length of his *straight inflexible roller*, he would soon perceive, by applying it to the inequalities on their surfaces, that his roller having passed over, and reduced them to that beautiful level convenient for the scythe, it must frequently therein have suspended the whole of its weight on their prominences, and which supposed before the operation to have been only six inches deep in mould, have beaten them down to three of those inches, (in either case more or less,) in order to have come *barely in contact* with the surfaces of their cavities or hollows: and thus, by only looking through the right end of his perspective, would he clearly discern that his old unsuspected friend, the roller, had ever, in smoothing an uneven surface, deceived and involved him in *certain* though indeterminate loss, by including in its operations both the extremes of a too *little* and too *great* pressure, with their certain and unavoidable consequences, as in the above preliminary described. In figure 3, plate 2, will be seen its demonstration;

where, for convenience of calculation, the length of a roller is supposed to be equal to that of the diagram, viz. ten feet six inches, being just three times that of each of the divisions of the one here recommended. The two parallel lines (*a, a,*) seen under the profile (fig. 1) of the latter, representing a depth of mould of six inches in a newly-sown field, and the included segment or crooked line (*b*) running from end to end, a hollow or cavity thereon of only three inches, (and which, without the application of the rod, the experimenter would be little aware of,) it will be evident that the roller, in having passed over and levelled the plot, by *barely touching* its surface at *c* in the middle, *must* at each end at *d, d,* have beaten down the six inches of mould to three inches only in thickness, as at *g, g;* and consequently have so squeezed its particles together, as almost to have excluded the agency of *air*, although indispensable to vegetation; as, were it completely shut out, the seeds would not even germinate or sprout; and which may be easily proved by corking some of them with moist earth in a small glass phial: while, if the operation had been deemed necessary to keep out drought, malting, &c. the mould under the middle of the roller must have been wholly deprived of its aid; and in which problem is seen a display of the principle, as, more or less, in continued act, to the great and certain, though unperceived, retardation of the processes of vegetation. And which, howso-

ever, never before apprehended by our experimenting friend, whether of two, three, or four score years of age, unless we could suppose him disclaiming the use of his eyes, he must, necessarily, from the best of all reasons, perceive, viz. the *impossibility* of his doing otherwise.

Now, if instead of *ten* feet six inches had his roller been only *three* feet six, as from *e* to *f* in the diagram, (the length of each of our two divisions,) the depression of the same segment under the middle of it, instead of *three entire inches* would not have been *half a single one*, as seen at more than two and a half above *c*; a difference totally unworthy of notice.—Indeed the whole of this developement would be perfectly unnecessary with any *attentive* person walking behind the divided roller when in its work; as he would perceive it constantly adapting itself to every inequality of surface, and howsoever irregular, giving it a degree of pressure sufficiently equal in all its parts for every purpose.

And here, whilst on the subject of *attention*, would I beg to recommend to the regard of our experimenter, the error in a practice but too general, of casually, and without discrimination, rolling spring crops, when tender plants from grass seeds usually accompanying them may be just rising above ground, and when a clod not bigger than a walnut may crush half a score of them to death. The operation ought

by all means, if practicable, to take place before the plants make their appearance.

Applied on meadow or pasture grounds, when hayned up for mowing, our jointed roller has been found equally effective and beneficial ; and in beating down their worm-casts superior to others ; as rollers of greater length coming at those only on their prominences, leave enough in their hollows, when hardened by summer heat, to constantly deprive the scythe of its edge ; and whereby the loss of weight in the hay crop will be trivial, compared with that in the grass not having been cut closely down to the surface, and which has been repeatedly proved by experiments made for the purpose. Indeed the position will want no proof with a person aware of the necessity of keeping *closely fed* Peacey's perennial ryegrass, and while he observes how it immediately sprouts out on every side in consequence.

Jointed rollers have been frequently produced by others ; but wherein their respective authors, aiming at improvement, have almost totally missed their mark in having given them a whole *inflexible axle*, whose effect in operation must in all cases, but that of *turning at land's ends*, be tantamount to that of a continuity in the roller itself. The improvement, however, for *this alone*, is sufficient to justify the measure ; as the depredations frequently committed there on spring corn and its attendant grasses, by long undivided rollers, are such as their proprietors

would never quietly witness, were they conscious of a means of prevention. This power our flexible roller in an eminent degree possessing, together with that of instantaneously adapting itself in all cases to every alteration of surface; it with equal facility conforms to any direction in its work, whether longitudinal, across, oblique, or spirally, ring within ring, around the field.

Its very *superior* though unforeseen effect to long continued rollers of *equal weight*, in reducing clods on tillage lands, affords also an indelible proof of its more general and uniform pressure.

At *a* in the same profile is represented a footstall for the driver to stand on, while guiding with his whip and reins a pair of horses in the shafts. In this situation the two horses, with their roller, although equivalent in point of breadth to only three, drawing in one ten feet and a half long, will however be much more expeditious in their work individually, from the disposition in all of the species, when attached to *balances* swaying behind them, to urge each other on, through an aversion to being drawn backwards. The *vis inertiae* in the motion of the roller itself, when excited or set going, gives it also additional celerity. The same property, however, till that motion is obtained, giving it also equal retardation; and as in operating on land covered with large hard clods, such impulse is successively and continually interrupted, the bending of the in-

strument is in this case found correlatively retardant to the moving power ; and which is one cause of its superior efficacy in breaking such clods ; it will, therefore, be a horse very advantageously employed, if one be attached for the purpose to the middle shaft before the other two, and additional weight be applied, both on the footstall and also on the frame.

From a squeamish aversion to being dubbed coachmen, it has been found that boys have sometimes a dislike to mount on this footstall ; it must be always, however, peremptorily insisted on, as well with a view to their driving with much greater accuracy and ease to themselves, as to preserve a balance in the weight of the rollers ; the outward ends of the latter being necessarily in their formation somewhat thicker and heavier than the inner ones, and as also the weight of the frame is in great measure suspended on those outward ends. If the driver be not made to ride, a sack with earth in it, or some other matter at least equal to him in weight, should be affixed on the footstall in his room.

Fig. 2 is a geometrical plan of the rollers ; wherein is more distinctly seen the footstall *a* ; its two uprights *b*, *b*, and a transom or cross-piece *c*, with an iron semi-circular ring screwed to the latter ; within which the driver standing erect, he will have the whole of his work in distinct view before him, and while he will be thereby effectually prevented from falling on either side. The footstall has also edge-boards, about three

inches in height, fastened round it, to keep his feet from slipping.

d, d, two end rings of a common balance; the necessity for which, in most cases of draft, has, at page 362, been already in some measure shewn. The rings only are seen in the plate, as the balance is obscured by the fore transom of the frame; it will, however, it is presumed, be easily understood from part of an appropriate harness, alluded to at p. 365, being exhibited for the purpose; and as the mode of attaching it to the centre of the frame is also seen in fig. 1.

Figures 4 and 5 represent the extent given the rollers for rising and sinking, in adapting themselves to the form of the surface. At fig. 5 is seen an appearance of a defect in the rollers, when thus depressed, separating at bottom; instead of which it however involves an excellence; as it seldom accrues but when moving longitudinally, they dip into some furrow where pressure is not necessary; and as, in consequence, the separate rollers come into contact when passing along the top of a ridge, as seen at fig. 4, where such pressure is particularly required.

Figures 6, 7, and 8, are different representations of the joint of the two axles passing through the rollers, and with a view to perspicuity, on an enlarged scale of inches adjoining.

Fig. 6, the joint, as seen from behind; the blank section *a, a*, being that of a flat bar of iron passing

between the rollers, and receiving the hooked ends of the two axles, one with checks embracing a tongue of the other; a profile of the bar is seen at *d*, fig. 1.

Fig. 7 displays the joint, as seen endwise; and,

Fig. 8, a plan, or bird's-eye view of it.

L. TUGWELL.

Bath, Oct. 12, 1813.

P. S. The above roller being formed of cast iron, may be considered as of almost endless duration; however, although it is intended to give out, ere long, ploughs and other machinery calculated for a more perfect culture of the earth, of the same inflexible material, still such duration respecting it may be properly understood as a very trivial recommendation, compared with that of its being *unalterable*, and consequently *ever* throughout its lengthened duration executing its various operations in the first style of excellence, and at the least possible expence.

ERRATA IN THE FOREGOING ESSAY.

- Page 300, l. 28, after *here* insert a comma.
- 307, l. 2, for *dwelt* read *dwelt on*.
- 308, l. 5, dele *mere*; and l. 6, for *more* read *mere*.
- 338, l. 3, for *imperceptible* read *perceptible*.
- 352, l. 1, 'or *papillary* read *papilionaceous*.
- 358, l. 34, after *examination* insert *and*.
- l. 36, dele *and*.

[The foregoing Essay was penned last year. This remark may tend to reconcile the reader to some ideas he may meet with, that may not be applicable to the more propitious period which the return of the blessing of peace has put us in possession of. To have made a suitable alteration in every instance would have deranged too much the author's arguments, which are, however, not wholly altered by the happy change of circumstances. Every discerning and candid reader will be enabled to discover, and duly to appreciate, the difference occasioned by the times.

It may be thought by some readers that the Essay is too diversified, and extended to an improper length. The Committee wished it had been shorter. With this view, the Author was respectfully requested to revise it, and make some considerable abridgments: but he repeatedly declared he could not do so without injuring the *coherence* of the topics, and weakening the effect of the whole. It was also found more difficult for *another* hand to shorten the periods, and alter the peculiarities of the style, to the author's satisfaction. The Committee considered the piece as containing too much agricultural knowledge and useful information to be withholden: they therefore determined to let it go to the press in its native dress, not doubting but the worthy author's laborious *endeavours* would be received with due candour. They presume also, that the many excellent practical hints and statements, however immethodically arranged, will compensate for the most patient attention of the *agricultural* reader.—ED.]

ARTICLE XIX.

Report of the Committee for inspecting Swedish and other Turnips, in Claim of Premiums offered by the Bath and West of England Society.

WE waited on Mr. Bennett on the day of his own appointment, viz. the 25th of March, to inspect his turnip crops, and proceeded with his servants first to the field of drilled Swedes, consisting of about eighteen acres. We were prepared to see this valuable root, the Ruta Baga, cultivated in a superior stile, and in this we were not disappointed; the practical knowledge of our worthy president* is too well known to need any comment of ours. On weighing the bulbs, we found the average acreable produce to amount to 38 tons 13 cwt. 64 lbs.; these were growing at Pyt-House Farm, in the highest state of cultivation, and scarce a weed to be seen. We then rode to look over the crop of drilled purple Norfolk turnips, of about fourteen acres, growing at Berwick Farm; and work better done, or where skill was displayed in the cultivation, we

* Of the Wiltshire Agricultural Society.

have never witnessed. The conviction on our minds at the time was, that if the weight of the crop equalled that fixed on in your Premium Book to entitle the claimant to the premium, there was sufficient merit to award the same. This, however, was immediately afterwards ascertained by actual weighing, and proved to amount to 31 tons 1 cwt. 2 qrs. 24 lbs. per acre. Under the drill system, the turnips will always be more equal in size and weight, in consequence of the correct distribution of the manure, and the more equal distance at which the plants stand than when sown broadcast.

Thinking that Mr. Bennett's general farming system, if stated by himself, might be acceptable to your Society, we made to him the request, which he has politely complied with, and you have his letter annexed.

THOMAS TANNER.
JOHN GABY.
JOHN GRANT.

Urchfont, 28th March, 1814.

ARTICLE XX.

*A Letter from John Benett, esq; on his
Mode of Farming.*

[Addressed to the SUPERINTENDING COMMITTEE.]

Pyt House, March 28, 1814.

GENTLEMEN,

IN compliance with your request, I now give you an account of my general farming system. I have two farms in my own occupation, one at Pyt-House, the other at Berwick. The soil of my hill land at Pyt-House is a sandy loam, on a subsoil of freestone; this is sown in four fields. 1st, wheat, 2d, Swedish turnips; 3d, barley; 4th, half the field clover, and the other half forward turnips. My wheat, therefore, always follows the broad clover and turnips; which turnips are either drawn and taken into the stalls for cattle, or fed with sheep on the same land where grown, as they may be wanted. A great deal of my clover is always carted green to the stalls. On this system, supposing a farm to contain one hundred acres of arable land, it will be sown with 25 acres of wheat, 25 acres of Swedish turnips, 25 acres of barley, $12\frac{1}{2}$ acres of broad clover,

and $12\frac{1}{2}$ acres of forward turnips. By changing the clover and turnips alternately, these crops will only come once each in eight years, which will almost insure a good crop of clover. The principal objection to this plan is, that the turnips come too often. In answer to this I can only say, that though I am aware that turnips love fresh land as well as any other plant, yet I have been able to grow excellent crops without having varied my system for many years. I use about two-thirds of my turnips grown on my farms at Pyt-House in stall-feeding of cattle, which has of late returned a considerable profit; and the great quantity of dung by this means produced, must reproduce turnips, if properly applied.

My vale farm at Pyt-House I also manage in a four-field system, the soil of which is a sandy loam, on a sub-soil of clay, together with beds of gravel above the clay in spots, consequently subject to springs; but these are taken off by under-draining. The first year I plant wheat; second, turnips; third, oats; fourth, one half of the field after oats broad clover, one quarter beans, and one quarter vetches. Wheat always follows the clover, beans, and vetches. Clover, by changing with the beans and vetches, comes but once in eight years. Beans and vetches, by changing with each other, come to be planted on the same land but once each in sixteen years. I must observe, that on these farms I have sufficient meadow land to grow as much hay as I want.

My Berwick farm is of a very different description from either of the afore-mentioned: its situation is on the Wiltshire downs, of a flinty soil, with a sub-soil of chalk, and has always been considered as bad turnip land. This farm I sow in five fields. Its routine is, first year, wheat; second, about nine-tenths turnips, one-tenth winter vetches to soil oxen; third, barley; fourth, grafs for hay; fifth, half the field old grafs, to be spring-fed by sheep; the other half winter-fallowed, and sown in equal parts at the proper season with spring vetches and autumn turnips, both to be fed with my young sheep. I sow one half of my grafs field with broad clover, mixed with a very little ray-grafs; the remaining half with hop and ray, and a little Dutch clover. By thus changing my feeds, the land is never tired of either. Half of my old field in preparation for wheat gets a winter fallow; and that part of the fallow which is not sown to turnips or vetches, takes the sheep-fold as soon as it leaves the barley land. The other part of the old field is broken up in June, by what is with us called raftering or half-ploughing: and as the sheep-fold goes twice over it, I plough it clean before the last folding, by which the sheep dung is kept on the top of the ground; and as I drill my wheat, the dung is harrowed in with the seed. This farm I have occupied only three years, and it is now in good condition, being free from weeds and well manured.

I will now return, and state to you the whole process attended to in the cultivation of my turnips. I fallow my wheat stubbles as deep as the soil will admit of before Christmas, and cart all the dung from my yards, as fast as it accumulates, into the fields, and stack it in large heaps, in readiness for my turnips. As early as the land will work in the spring, the fallows are run back, and harrowed down fine: these operations should be done in dry weather. It is then ploughed by a swing plough (it cannot be done by a two-wheel plough) into single boat-ridges, twenty-seven inches from centre to centre of each ridge. The dung is then carted on the ground, to the amount, as near as I can ascertain, of twelve two-ox cart-loads per acre. My carts measure 4 feet 6 inches by 3 feet 9 inches, and 16 inches high; besides six such boards at the side, and are filled as high as they will bear. The dung is spread by women or girls in the intervals between the ridges, and the ridges are immediately split by the plough, and the dung covered up: by this operation a ridge is formed exactly over the dung. The seed is then drilled by a double drill, which is drawn by one horse or ox, and deposits the seed immediately over the dung on the tops of the ridges. In doing this, care must be taken that the drill is set to the proper width, as the ridges sometimes vary from being thrown up by different men. To do this I measure about twenty ridges, and having found the average

width, set the drill accordingly. It is desirable to have the rows of turnips at equal distances, that the horse-hoe may be worked to advantage. As soon as my turnips are up, I always strew lime-dust* or coal-ashes over the young plants, and if possible in the dew of the morning, or when the leaves are wet with rain; this sometimes stops the fly, at the trifling cost of about 1s. per acre. As soon as the plants are in rough leaf, a small swing plough is used to pare away the earth from both sides of the plants, going as near to them as possible. The women next begin hoeing them with nine-inch hoes, leaving the plants from nine to ten inches asunder, and perfectly single; this is always done at once; for it is impossible to thin turnips evenly when drilled, if they are done ill at the first hoeing. I have the rows looked over again by the women, for the purpose of pulling up the weeds that escaped the first hoeing. A few days after the hand-hoeing, the horse-hoes are set to work, by which the intervals are well pulverized, the soil prevented from cracking, and consequently the turnips secured from being burnt up in dry weather. This horse-hoeing is repeated three or four times, as may be necessary; but I do not earth them up till late in the autumn, when the leaves of the turnips begin to drop. The double mould-board plough is then used, which earths up the turnips so as nearly to cover them.

* Wood-ashes or foot still better.

This drains the wet land, in a wet season, and protects the roots, both from frost and game, on all lands. I neglected doing this on my Berwick farm this last autumn, and suffered materially in consequence, by the decay of many good red Norfolks, which might by these means have been preserved.

I have long been in the habit of preserving a large quantity of turnips, which are grown on my field in preparation for wheat, by keeping them between sheep-hurdles pitched at six feet from each other; thereby forming a long stack, piled as high as is necessary to form a roof; the same is thatched over, but left open at the sides for the air to pass through; the more airy the situation, the better. The green must not be cut off too close, so as to injure the crown of the turnip, for a turnip will either shoot out, or decay immediately; should the crown be injured, it will decay. In a stack of this kind, turnips will grow slowly the whole of the winter, and may be preserved till the end of April; though I generally consume mine much earlier, and then stack my Swedish turnips between the same hurdles, and keep them till the end of May. I have only to add, by way of observation, that experience has taught me that the distance before-mentioned for drilling the rows of turnips, and for having them in the rows, is that which will produce the greatest acreable produce. It is best to drill full two pounds

of seed to an acre ; for when thick in plant, turnips are not so subject to be destroyed by the fly ; they cannot be hoed too early, if the hoers can distinguish them from the weeds.

I believe the best manure for turnips (except yard dung and vegetable ashes) to be fresh earth. I generally contrive to raise yard dung enough to manure the whole of my turnip land ; and it is unwise to sow more land than can be supplied with manure. Ten acres of land, well dunged, will produce more weight of turnips than twenty in an impoverished state, and will cost but half the expense in labour. I consider my turnips as the most profitable crop ; in proof of which I would inform you, that nearly all the oxen and cows which were exhibited in my stalls, are sold completely fat ; they never had any food but turnips, excepting two months feed on after-grass, and a very small quantity of hay with the turnips.

I sold the two Hereford oxen which were exhibited by Mr. Hughes, and won the premium at the Wiltshire Agricultural Society, as working oxen, in July last, and which I afterwards bought of him at 64l, for 120l. ; I believe they were the best oxen that have gone from this neighbourhood to Smithfield for many years.

I fear I have extended this letter to a tedious length ; and though I do not believe it will afford

much information to yourselves, yet it may possibly be acceptable to some of our zealous agricultural friends; in that hope

I remain, Gentlemen, your's very sincerely,

Pyt-House.

JOHN BENETT.

ARTICLE XXI.

Report of the Committee for conducting the Ploughing Match for the Premiums of the Bath Society, 1814.

IT may be proper to premise, that on account of the unavoidable absence of Mr. Gordon Gray and Mr. Tugwell, who were chosen on this Committee at the last (April) meeting, Mr. Wansey kindly undertook to supply the vacancy by his personal attendance.

We had the pleasure to witness a very satisfactory experiment at Norton Farm, near Warminster, in the occupation of Mr. Richard Pocock, who had the kindness to allot a spacious piece of level ground, nearly contiguous to his house, situate under Salisbury Plain; and also the goodness to forward the

views of the Committee by causing several portions thereof to be accurately measured into half-acres.

It is to the credit of this district that there does not exist that rooted prejudice against the use of oxen which elsewhere prevails. The consequence was, that out of eight ploughs which appeared to contend for the premiums of the Society, three of them were drawn by a pair of oxen each ; and not a single plough was to be seen with more than *two* horses ; and only in one instance with a driver. Mr. Pocock is himself an advocate for the use of oxen, having twelve yoke constantly at work on his farm, though he seldom uses less than three in a plough. That he did not enter into competition is only to be attributed to his delicacy, lest it should be conceived that partiality might be exercised towards him on his own ground. Mr. Pocock being perfectly disinterested in the result of the experiment, the Committee thought him a proper person to be a judge of the merits of the work ; and therefore requested him, in conjunction with Mr. Thomas Chandler, of Heytesbury, and Mr. Thomas Roles, of Norton, to take that office.

The Ploughmen having drawn lots for portions of land, the ploughs were arranged numerically, and all proceeded to their tasks together. The following is a list of the competitors, stationed according to their lots.

No.

1. John Benett, esq. His own swing-plough, drawn by two oxen ; Wm. Ford, ploughman ; 2 hours 37 minutes.
2. Mr. Strickland. Lancashire swing-plough, drawn by two oxen ; William Target, ploughman ; 2 hours 50 minutes.
3. Mr. Barter. Bratton plough, drawn by two horses ; James George, ploughman ; 2 hours 13 minutes.
4. Mr. Lye. Bratton plough, drawn by two horses with leader ; Nath Newman, ploughman ; 2 hours 18 minutes.
5. Mr. P. Whitaker. Bratton plough, drawn by two horses ; John Newman, ploughman ; 2 hours 28 minutes.
6. Mr. Benett. His own swing-plough, drawn by two oxen ; George Rogers, ploughman ; 2 hours 30 minutes.
7. Mr. Davis. Plenty's plough, drawn by two horses ; Wm. Gray, ploughman ; 2 hours 14 min.
8. Mr. Strickland. Scotch plough, drawn by two horses ; John Crayston, ploughman ; 2 hours 14 min.

This being the result of the trial thus far, the umpires were left to form their opinions as to the merits of the contending parties ; and, as is customary at the dinner, they presented the following adjudication.

*Norton Farm, near Warminster,
May 4, 1814.*

HAVING undertaken, at the request of a Committee of the Bath Society, to determine on eight ploughs that contended for the premiums of said Society; we do unanimously agree, upon considering the two specified conditions, "cheapest and "best," to award the first premium to Mr. Benett's swing-plough, No. 6, drawn by two oxen; and the second premium to Mr. P. Whitaker's Bratton plough, No. 5, drawn by two horses; and the premiums proposed to their respective ploughmen accordingly.

RICHARD POCOCK.
THOMAS CHANDLER.
THOMAS ROLES.

The company present who witnessed this experiment, approved, with us, of this decision. We therefore request the General Meeting to whom this report may be made, to confirm the same, by recommending to the annual meeting to award the first premium, five guineas, to John Benett, esq; and the second premium, three guineas, to Philip Whitaker, esq. To George Rogers, the manager of the first plough, a coat and buttons, and one guinea; and to John Newman, the manager of the second plough, a coat and buttons.

The meritorious exertions of good ploughmen are worthy of being recorded. On this ground it is impossible to pass unnoticed the excellent ploughing performed by Nath Newman, the holder of Mr. Lye's Bratton plough, No. 4. To this man, it was generally supposed that one of the premiums would have been assigned; but he was precluded by the conditions of the premium; he having had the assistance of a driver, *cheapness* could not be ascribed to the work.

Where so much zeal, and emulation to excel, were manifested, it would have been painful to have suffered the unsuccessful ploughmen to go wholly unrewarded. Without trusting, therefore, to the precarious effect of a small individual subscription, (especially in the prospect of a small company only,) to be divided among the other six ploughmen, we so far exceeded our commission as to direct the Secretary to present these meritorious competitors with 5s. each, as a manifestation of our approval of their well-achieved though unsuccessful endeavours; feeling assured of the Society's will and wish to encourage the lower, though not unimportant, class of agriculturists; leaving, however, the confirmation of this act to the pleasure of the Society.

One other striking feature in the day's experiment we cannot omit remarking, namely, William Ford who ploughed his half-acre with Mr. Bennett's swing plough, drawn by two oxen, in two hours

and thirty-seven minutes. He is a stout lad of only thirteen years of age ; which proves the objection “ that oxen are not to be managed by boys ” to be incorrect. This lad bids fair, at an early day, to be a gainer of prizes at these praiseworthy experiments.

We rejoice to find that every year’s Ploughing Match for the premiums of the Society produces a fresh proof that much *good ploughing* may be performed (with well-constructed implements, and the improved intellect and subdued prejudice of ploughmen) in less time, and with much inferior force, than has for too long a time been the practice ; whereby the profit of the farmer is increased, and the good of the community ultimately promoted.

If, upon revival, any alteration should be thought necessary in the premium, we trust it will be in favour of the labouring class, either as to the amount or number of premiums offered.

We cannot conclude our report without expressing our obligations to Mr. Pocock, for his ready assistance in providing and marking out the ground ; and for his conspicuous hospitality to the company, and to the men who displayed their skill in this experiment.

We remain the Society’s humble servants,

J. BENETT.

J. TANNER.

HENRY WANSEY.

ARTICLE XXII.

On the CORN LAWS.

SINCE our last publication, the general mind of the public has been much agitated on the subject of the Corn Laws; a subject confessedly of great interest to the agricultural part of the united kingdom, and, indeed, to the people at large.

The great change in the posture of affairs in Europe, by the happy return of peace, after a long and distressful warfare, having removed restrictions, opened anew most of the channels of commerce, and restored to the various governments their common rights of intercourse with each other, the corn trade, as a consequence, has taken a new complexion. Although the abundant supply of the late years, especially the last, had been sufficient to make a very remarkable alteration in the prices of grain, the inundation of foreign supply had still further lowered the market. From both causes an effect had been produced, which had naturally excited an alarm in the agricultural part of this country, and the landowners and farmers became equally thoughtful how the late high rents of land were in future to be paid. These high prices had been the natural con-

sequence of increased population and demand, the great increase of capital employed for the unparalleled expence in the improvement of land, the advanced prices of labour, and every other article. Without some regulations, indeed, it was clearly impossible to proceed. It then became a question, under all these circumstances, what plan could be adopted, at once compatible with the interests of the landowners, the farmers, and the consumers at large. Complicated and difficult as this question may seem to be, nothing less than a solution of it was desirable to be attempted. As a question peculiarly of a public nature, there was a particular propriety in endeavouring to determine it on full and fair evidence. That such evidence might be obtained, it was thought proper that a Committee of the House of Commons should be appointed, who might take the examinations of the most intelligent and experienced persons, relative to the present state of the national agriculture. A long list of such persons (thirty-six in number) was accordingly examined daily by that respectable Committee, to points of fact and opinion, at great length, from the 10th day of June to the 20th day of July last. From the general tenor of those various examinations, several important points were established. It appeared, that, notwithstanding the great increase of our national population of late years; the large capitals embarked in agriculture, for the improvement of waste, un-

productive, and inferior lands; so great had been the increased skill in the management of lands in general, that the average produce of late years had gone far towards supplying the national demand: but this grand point had not been effected without great exertions, in zeal and cost, among the chief land-owners, yeomanry, and principal farmers. That from the peculiar circumstances of the times, every article of farming and family expence, inclusive of the weight of taxes, poor's-rates, and labour, had so much risen in value, during the period of the last twenty years, as to have *doubled* the cost of the cultivator: the price of land, from similar causes, and from the demand for the article, had also risen in the same proportion: also that on account of the great advance of all commodities of housekeeping and accommodation, it was clear that land-owners in general were not relatively in a better situation than when lands were at *half* the present advanced rents. That on account of the very great expence annually attending the cultivation of numerous clay and poor lands in this kingdom, it would be impossible to continue their cultivation for corn, at the present low prices of corn-produce; and therefore that such lands must be again generally laid down to pasture, to save the expences of culture by the plough. A change which would be slow in producing even an inferior produce; and should those lands be ever reclaimed to corn-culture, such new change must be

equally flow and expensive for that operation. Thus there would be produced an alarming revolution in the present improved system of agriculture in this country, and a consequent scarcity of home produce ; many farmers would be ruined ; and numerous labourers in husbandry with their families would be thrown out of employ, and cast upon the parish for support ; while the nation at large might possibly be reduced, in a time of general failure of crops, to a want of a supply of grain even at high prices. To prevent these national grievances, it would become expedient to institute certain regulations in the imports and exports, in order to give the British cultivators a *protecting* average price for corn-produce, so as to secure to the farmer at least *ten shillings* per bushel for wheat, and other grain in proportion, thus to preserve the agriculture of the country.

In the mean time there have been presented many hundreds of petitions from different towns and districts of the nation, praying that no alteration in the corn laws may take place, by which the present low and moderate prices of grain may be affected ; and assigning various reasons of humanity to the lower classes, and of policy in favour of trade and manufactures, for those petitions.

Such was nearly the outline of the examinations before the Committee of the House of Commons, and of the public alarm. It may be expected that

the meeting of Parliament will produce some further important measures; but what changes will take place in consequence, time must determine. The Superintending Committee of this Society do not feel it prudent, in the present state of affairs, to venture an opinion thus publicly, or to pre-judge the wisdom of the Legislature in this difficult business; well aware as they are that the clashing interests of the numerous population, together with the weight of duties and taxes necessary to defray the national expenditure, even in a time of comparative peace, must render the present period awful!

Subjoined to the aforementioned Parliamentary examination, are numerous tables and statements, respecting imports and exports of corn, flour, &c. to and from different countries, at different periods; of which the most important to be inserted in this work, as affording curious information, is the following, viz.

*An ACCOUNT of the Quantity of WHEAT and
WHEAT FLOUR Exported; and of FOREIGN
WHEAT and WHEAT FLOUR Imported; in
the following Years :*

ENGLAND.	Wheat and Flour Exported.	Foreign Wheat & Flour Imported.	ENGLAND.	Wheat and Flour Exported.	Foreign Wheat & Flour Imported.
Years.	Quarters.	Quarters.	Years.	Quarters.	Quarters.
1697	14,699	400	1726	142,183	—
1698	6,857	845	1727	30,315	—
1699	557	486	1728	3,817	74,574
1700	49,056	5	1729	18,993	40,315
1701	98,324	1	1730	93,971	76
1702	90,230	—	1731	130,025	4
1703	106,615	50	1732	202,058	—
1704	90,313	2	1733	427,199	7
1705	96,185	—	1734	498,196	6
1706	188,332	77	1735	153,343	9
1707	74,155	—	1736	118,170	16
1708	83,406	86	1737	461,602	32
1709	169,680	1,552	1738	560,596	2
1710	13,924	400	1739	279,542	5,423
1711	76,949	—	1740	54,390	7,568
1712	145,191	—	1741	45,417	40
1713	176,227	—	1742	293,260	1
1714	174,821	16	1743	371,431	2
1715	166,490	—	1744	231,984	2
1716	74,926	—	1745	324,839	6
1717	22,954	—	1746	130,646	—
1718	71,800	—	1747	266,907	—
1719	127,762	20	1748	543,387	385
1720	83,084	—	1749	629,049	382
1721	81,633	—	1750	947,602	279
1722	178,880	—	1751	661,416	3
1723	157,720	—	1752	429,279	—
1724	245,865	148	1753	299,609	—
1725	204,413	12	1754	356,270	201

*An ACCOUNT of the Quantity of WHEAT and
WHEAT FLOUR Exported; and of FOREIGN
WHEAT and WHEAT FLOUR Imported; in
the following Years :*

GREAT- BRITAIN.	Wheat and Flour Exported.	Foreign Wheat & Flour Imported.	GREAT- BRITAIN.	Foreign Wheat & Flour Imported.	Wheat and Flour Exported.
<i>Years.</i>	<i>Quarters.</i>	<i>Quarters.</i>	<i>Years.</i>	<i>Quarters.</i>	<i>Quarters.</i>
1755	237,466	—	1784	89,288	216,947
1756	102,752	5	1785	132,685	110,863
1757	11,545	141,562	1786	205,466	51,463
1758	9,234	20,353	1787	120,536	59,339
1759	227,641	162	1788	82,971	148,710
1760	393,614	3	1789	140,014	112,656
1761	441,956	—	1790	30,892	222,557
1762	295,385	56	1791	70,626	469,056
1763	429,538	72	1792	300,278	22,417
1764	396,857	1	1793	76,869	490,398
1765	167,126	104,547	1794	155,048	327,902
1766	164,939	11,020	1795	18,839	313,793
1767	5,071	497,905	1796	24,679	879,200
1768	7,433	349,268	1797	54,525	461,767
1769	49,892	4,378	1798	59,782	396,721
1770	75,449	34	1799	39,362	463,185
1771	10,089	2,510	1800	22,013	1,264,520
1772	6,959	25,474	1801	28,406	1,424,766
1773	7,637	56,857	1802	149,304	647,664
1774	15,928	289,149	1803	76,580	373,725
1775	91,037	560,988	1804	63,073	641,140
1776	210,664	20,578	1805	77,955	920,834
1777	87,686	233,323	1806	29,566	310,342
1778	141,070	106,394	1807	24,365	400,759
1779	222,261	5,039	1808	77,567	81,466
1780	224,059	3,915	1809	31,278	448,487
1781	103,021	159,866	1810	75,785	1,530,691
1782	145,152	80,695	1811	97,765	292,038
1783	51,943	584,183	1812	46,325	246,376

ARTICLE XXIII.

[The following subject was introduced in a rather unusual manner; but on account of its importance to *planters*, it gains a place in the present volume. If the *appearance* of the insect be equally alarming next summer, the Committee of Agriculture and Planting will be glad of information of the fact, but more so to hear of a remedy.]

To the Editor of the Bath Chronicle.

ANY disastrous event respecting our *Timber Trees* cannot fail to be noticed with national solicitude. A disease of a most inveterate and alarming nature, has lately attacked the *Larch* tree, in sundry situations, and it is very desirable to know whether it be general, or local. It has visited some of the largest as well as the smaller plants of that beautiful race, in the form of a whitish insect resembling the *American bug*, which some years ago began its destructive ravages on our apple-trees. But the modern enemy is vastly more multitudinous, inasmuch that the largest larches are frequently found covered with this insect, like a hoar frost, throughout all their branches. We have heard of some plantations in which this kind of tree is universally visited by the enemy in question, and that

the proprietors meditate a speedy and total removal of them from their woods.—This may be too hasty a step; especially if it be found that the insect does not prey upon any other kind of plant. The Larch, in addition to its singular beauty, has of late years been much reckoned on as the most valuable for timber, of all our varieties of firs. To lose it would be, therefore, a national misfortune. In the present state of the subject, those Gentlemen in the western counties, who have plantations, would confer a particular favour by sending accounts of their larches, directed to Mr. Ricards, at Hetling-house, Bath; also their opinion as to the origin of the disease; how far the insect resembles any formerly known; and what the most probable means, if any there be, of its extirpation?

WM. MATTHEWS.

Hetling-House, July 11, 1814.

On the LARCH BLIGHT.

[Communicated by Letter to Mr. MATTHEWS.]

Innox Cottage, Frome, 30th Aug. 1814.

MY GOOD FRIEND,

YOUR notice in the Bath Chronicle, July 11th, of the disorder lately observed to attack *Larch Plantations*, claims particular attention

from the horticulturist, in order that, by attentive and repeated observations, some remedy may be found for the evil,—if an *evil* it proves to be.

The disorder in question, I find, arises from a multitude of minute insects, whose economies and habits are yet but little known to us. These insects have visited some of my larches, for three seasons past ; but as I perceived no immediate evil resulting from their visits, my observations of them were but slight, until the present season.

In the month of May, numberless white spots on the leaves are perceived, which, in a few days, increase in size, until many of them become equal to *one tenth* of an inch in diameter, and in number, on each tuft of leaves, from *two* to *thirty*. On viewing them with a megalascope, I found that they were merely envelopes of eggs, as cases or cocoons, of a web minute as the finest gossamer, and of a most beautiful cotton whiteness. The number of eggs in each envelope appeared to be from *two* to *ten*. Reckoning from *sixteen* to *twenty* of such tufts to each infested branch, and from *forty* to *sixty* of such branches on a tree, the number of eggs on each infested tree may be estimated from *eighty-six thousand* to *one hundred thousand*.

In the middle of July I observed that these cocoon envelopes were a little discoloured, and were become somewhat ragged : this change was, at first, attributed to the many heavy showers of

rain which had lately fallen ; but on investigation I discovered that nature had been employed in producing from the egg a beautiful, minute, brown insect, of a short oval body, *one-fiftieth of an inch* in length, with six legs and two clavated antennæ, and which (though scarcely perceptible to the unassisted eye) under the microscope became an interesting, distinct, living object. Among the many hundreds which have been under my observation, I have not yet discovered any of them possessing the advantage of wings ; hence, in their present state, we must consider them to be of the *acarus* tribe.

Philosophers know that many insects undergo several successive changes of form, Leuwenhoek says four or five, and that it takes some of them several years to arrive at their final state. Unless, therefore, the last change of these larch insects be to the winged state, I do not perceive how the original parent came into this neighbourhood, or how the progress of colonization is carried on : for their rate of travelling, under their present form, I do not estimate at more than an inch in an hour : it would therefore take them more than *seven years* constant walking to transport themselves to another station a mile distant.

In the beginning of this month I observed that very many of them had forsaken the leaves, and retired to the furrows in the bark of the branches ;

there resting in a quiescent state, as if waiting some other change.

On examining my trees some days since, I found but few insects remaining, and those few very sluggish, almost inactive; those which had deserted; having left behind them on the leaves much excrement and broken exuvie, which had a squalid appearance; but as these trees are deciduous, that inconvenience will be shortly overcome by the autumnal fall of the leaves.

Upon the whole, these creatures do not appear to me to be predatory or any way injurious to the leaves; but should others think differently, and wish to be rid of them, I would recommend *fumigation*, at the latter end of April or beginning of May.

Your's sincerely,

A. CROCKER.

P. S. Whether this newly-observed insect be or be not prejudicial to our plantations, we have of late years one that is decidedly formidable to the garden. For the last four seasons I have observed, about the beginning of June, vast multitudes of small brown chaffers, flitting to and fro over a mown lawn, a few inches above the surface, for ten days or more in each season. Their business on this lawn appears to be harmless,—merely the propagation of their species; and this done, they migrate in detached parties to the neighbouring

gardens, where fruit, flowers, and leaves, are alike subject to their bite. These chaffers are of the form and colour of the well-known cock-chaffer; and I should have considered them as the fern-chaffer, spoken of by that faithful observer of nature, Mr. White, of Selborne, had he not told us that his *scarabæus solstitialis* was punctual in its appearance in Hampshire about the 26th of June, and that it was about *half* the size of the *May chaffer*; whereas these *scarabs* are not more than one-third the size of the *May chaffer*, and arrive here about the 5th or 6th, instead of the 26th, of June.

Robusta Larix igni impenetrabile lignum.

SIR,

YOUR letter of the 11th ult. I have considered with particular attention. You cannot be too anxious for the prosperity and increase of the Larch plantations; and your solicitude on that subject is perfectly laudable, there being no species of timber, except the Oak, which promises more national benefit. Not to mention the great advantages of beauty, stature, girth, weight, and duration; the well-known motto which I have taken from the Roman Poet, furnishes us with an im-

proveable hint for our naval and domestic architects. A new affection has certainly, for some years past, attacked this noble tree. It prevails very generally in a plantation of mine in Berkshire. The trees are subject to a blight, bearing a whitish appearance; and when examined by a microscope, it resembles cotton hanging on the leaves, and containing several eggs in a kind of nidus. These eggs are of a brownish colour. Admitting it to be a disease, I consider it neither disastrous nor alarming, because I find that it only affects the lower branches; and that the tree, notwithstanding this insect, grows and flourishes very rapidly, attaining, in the course of sixteen years, to the respectable height of 36 feet and upwards. As to the true origin of this affection, I can form no positive conjecture; but should be rather inclined to believe, that the eggs of the blight must have been received in some cones recently imported. As to the duration of the disease, in all likelihood it may continue for a few years. Yet still this should be no discouragement to the propagation of the Larch, as I have no doubt that a speedy and total disappearance of it will be effected by the change of soil and situation. It differs from the white blight in apple trees. It is not bloody; and it does not adhere to the body of the tree, but to the leaf only. The remedy for the blight in apple trees, which generally ends in canker if

neglected, I have found to be simply excorticating the part affected.

I am, Sir, your most obedient,

Sept. 1, 1814.

SYLVICOLA.

To W. M. esq; Hetling house, Bath.

ARTICLE XXIV.

From John Franklen, esq; on the Management of his Farm in the Vale of Glamorgan.

[To the SECRETARY.]

SIR,

PURSUANT to your letter, and that which Mr. Matthews favoured me with, I will communicate what I think may be useful, after near fifty years experience in farming.

I cultivated Mangel-Wurzell many years with success, before the late war, and the increase of copper and iron works in this county, which lessened the number of hands, and increased the price of labour. About 20 years past I allotted four fields on my farm, each computed five or six acres, to try whether I could, by following the Norfolk course of alternate crops, (without the loss of a year to fallow and

clean the land, which some respectable writers, and many experienced cultivators think necessary,) keep the land free from rootweed; but I think that much depends on the nature of the soil, which it is material to describe as plainly as possible, so as to be intelligible to the generality of farmers. Mine is mostly a strong clay, over a blue limestone, called, in the vale of this county, *lyon* or *layon*, and used here successfully in making cisterns and ponds in the angle between our fields. I have cropt those four fields for about twenty years with wheat, turnips, barley, and clover, successively. I manure, for drilled turnips, with dung from the fold court, and to save labour (as hoers are scarce) I horse-hoe the intervals with an expanding horse-hoe; and hand-hoe and weed the rows. I have found the yellow Swedish turnips stand the winter best; and of great value in the spring, when the Norfolk turnips, which I grow, in another part of my farm, for early feeding, are either damaged by the frost, or run to seed, so that the bulb becomes hollow and spongy; but the Swedish turnips, or *ruta бага*, retain their solidity and nutritiousness in a mild spring, after beginning to run to seed; and I have frequently carted off the leavings, the latter end of April, to an adjoining grass field, to prepare the land for barley, where my cattle and store sheep have eaten them with great avidity.

My barley is often so heavy as to lodge and injure the clover; which, on the contrary, in a wet season

sometimes grows too luxuriant, though sown after the barley is three inches above the surface; which inclines me to think that it would be better to sow clover or winter vetches in autumn, as soon as possible after barley harvest.

I generally prepare a compost with lime and earth, in the head lands, adding the scrapings of the road, and pond mud, when procurable; and plough my clover lay, and lay on my compost, in time for wheat sowing, which is done under furrow; because wheat sown on the clover lay with *one* ploughing and harrowing, as many do, will not stand the winter so well as when the land is ploughed two or three times in autumn, and the wheat sown under the furrow.

I think those four fields are now better than when I began the above-described practice. I have other lands too stiff and wet for barley, where the drains will not draw, in which I cultivate wheat, and drill tick or horse beans alternately, manuring for wheat with the above-mentioned compost, and for the beans with barn-yard dung.

When I began farming, turnips were little known in this county; but the premiums given by the Agriculture Society, and the example of many gentlemen, have effectually introduced them, where the farms are not too small, and the occupiers poor and illiterate, which is generally the case in the north and west part of this county. In those parts the little farmers chiefly depend on sheep and rearing small

cattle; and pare and burn the surface, and mix lime (carried a great distance) with the ashes, to raise an indifferent crop of wheat.

I find it convenient to use both oxen and horses for various purposes. I have had ploughmen from Scotland to plough with two horses abreast, with long reins, who plough as much daily as most of my neighbours do with six oxen; and I buy the ablest oxen, after they have been broke in, and sell them when they begin to grow stiff: there are very good cattle in this vale.

Our Society sent a millwright to the North, to obtain a model of a threshing machine, soon after the invention, and the ablest farmers now use them; mine is worked by water.

I would raise more cabbage, borecole, and other food for wintering stock, if I could get hands enough; but the want of hands in these parts is a great impediment to the best husbandry.

I have lately used a *small* plough from Edinburgh, the Beverstone plough, and Gregg's scuffler, commonly called the tormentor in the West of England.

As to the corn trade, it must be known to every practical agriculturist, that the great increase in the price of labour, and the increase of taxes, makes it impossible for the grower to render corn at the present prices; so that less corn will be raised, and the country for importation. Therefore all disregard the interested

clamours, of the consumers in cities and towns, (who know not the farmer's expenses,) and wisely determine what is best for the general welfare. I think that a commutation for tithe, a general inclosure bill, and leases, would all be so.

With best wishes for the prosperity of your excellent institution, I beg leave to subscribe myself, your old farming correspondent,

JOHN FRANKLEN.

Lannihangle, 13th Oct. 1814.

ARTICLE XXV.

Upon the Commutation of Tithes.

To the Bath and West of England Agricultural Society.

GENTLEMEN,

IF I were to take up the lantern of the Cynic Philosopher, and diligently search for truth, I should not expect to find her dressed up in the bewitching garb of novelty; yet if I recognized her likeness, I would not disown her on that account. She is not confined to her dress; and to know her thoroughly, we must view her wholly. Thus looking

upon the ~~subject~~ of a Commutation of Tithes, most ably and learnedly as the subject has been investigated, one side of it may not yet have been explored; if so, truth is not fully known: for to investigate and judge rightly, we must go by the legislative rule of correct speaking,—“Speak the truth, the whole truth, and nothing but the truth.” The writer of the following thinks that the whole truth has not been examined; at least, the notice that has been taken of the subject by the authorized publications in the newspapers, and individual oratory, has appeared in this light to him. Availing himself of the Society’s invitation to throw all possible light on the subject, he submits his opinions, not pursuing the golden prize of honorary ambition, but rather to point out a forsaken path to others. Be it granted, tithes are a grievous burden, and an impediment to agricultural improvement; be it granted, a compensation is a most desirable object; and be it granted, that a fair compensation has been proposed. Is this, then, the only thing to be required, that *the clergy* should agree to it? It would so appear, while we hear about a protection and adequate provision for the just rights of the clergy, “to secure their interests, to promote harmony and goodwill between priest and people.” Let us then mature our plans, petition the Legislature, and, if a few unaccommodating narrow-minded of the order oppose its execution,

there can be no doubt of success, while wisdom presides, and justice is dealt to all.

But we naturalize the Italian proverb, “ Chi fa conto senza c’hoste conta due volte;” and, if from his Grace the Archbishop of Canterbury to the humblest vicar in his Majesty’s dominions, the fullness of approbation was bestowed, and every tithe-aggrieved wretch, expectant of the *law’s fiat*, stood ready to throw off his burden; *are there not other interested* voices, who have a right, and probably a will too, to cry “forbear.” Is this *solely* a *clerical* subject, a *clerical* question, a *clerical* interest? I do not wish to lose the argument in questionary declamation; but it is all declamation, oratory, and a misleading of the blind, if we state that to find a fair compensation for tithes, and to satisfy the mind of the tithe-owner, is a *clerical* subject, question, and interest.

I can easily believe that the great mass of our population in all the towns in the kingdom, in its political wisdom to ease the country of tithes, has no idea of *any other* than a *clerical* tithe-owner. I know well enough that the same opinion would not be easily controverted, if one were to hear the remarks and reflections of agriculturists upon the subject. I have seen an honest yeoman in great alarm and tribulation lest a small rise should take place, equal perhaps to half the worth in some tithes of small value that he paid; while not a spectator could have

divined that he himself had been in the regular habit for many years of taking his neighbour's tithes *in kind* to a great amount, with a cunning and tenacity that might have edified Bearblock, &c. &c. themselves ; but if the vicar had touched one of his young pigs, a cry would have echoed from the village to every market-town in the neighbourhood. But these, vulgar and crafty, in city or in country, are not among you scientific agriculturists ; *you are not ignorant of the whole truth*, nor unwilling, I trust, to hear it. But as it appears to me it requires greater vent, with your permission I will further enter into a few facts. Among yourselves, gentlemen, can you not reckon a number of tithe-owners, not of small tithes, hard to collect, and trifling in value, *not clerical* property ? Let the whole of the tithe-owners, members of the Agricultural Society, form a Committee, and tell us *what they are willing to accept as a commutation for their tithes*. This will be *argumentum non solum ad rem, sed etiam ad hominem* ; for the security that the Rector will be willing to take, I conceive the Vicar will not be disposed to refuse. I wish some man, of a knowledge far superior to any that I can lay the most distant claim to, would at this moment tell me his experience concerning the feeling of clerical and lay impropiators in the commutation of tithes, where enclosures have taken place. My own narrow information throws the *difficulty* so completely

on the *lay-side*, that probably it is the convincing motive that induces me, *uninterested*, to trouble the Society with this paper. In the parish *where I write*, an inclosure took place some years ago; the *vicar willingly* took land in lieu, as far as he could get it; but there are still three *lay improPRIATORS* in the different hamlets, two of whom have steadily taken their tithes in kind; the other at present rents them at one-third the rack-rent. There are three more *lay rectors* within two miles; in one place an inclosure is about to take place, and while the *clerical owner instantly* acceded to a commutation; it has been *invita Minerva*, that the *layman* has (all his desires being granted) given his consent. I could take a semicircle round Bath of twenty miles from the centre, and point out a few modes of *lay collection* of tithes, to parallel which I defy any one to produce *clerical* instances; aye, I would venture to select my cases from Members of the Bath Agricultural Society. Will it be said, "what has this to do with the commutation?" I answer, "every thing." It is the very thing that prevents, and is likely to prevent, a fair commutation. For if individuals make an inordinate profit, their demands for a commutation will be so high that the tithe-payer cannot accede to them; and in case of a commutation, the clergy are not to be meted in other scales than what the laity have prepared for themselves. Settle the point with these *lay tithe-*

bolders, let them be satisfied, and not one *spiritual* impropiator on the same terms will hold back in the whole kingdom. If tithes be hard to collect, uncertain in profit, and ungracious in the mode of collecting, they are chiefly *vicarial* ones; and it is not to be supposed that any vicar will demur, when his imperfect and uncertain dues are brought to a full valuation, and a new property is created for him, without trouble, care, or uncertainty on his part; without vexatious, trifling, discontented behaviour in that of others. But even now I see one of yourselves informs the Honourable Committee of the House of Commons, that tithes are worth as eight is to twenty; and what *tithe-payer* in the kingdom will give up that portion of his well-cultivated estate even to escape this burden? With these strong considerations about others, it does appear to me as unjust as it is illiberal, to hear the clergy cried out upon; to have an individual of that body bruited forth for *his* liberality, *his* dismissing petty prejudices, and mistaken views of professional advantage; *because these expressions are evidently meant in contradistinction to the whole body.* I join in the full merit given to that respectable person, as a worthy man and a gentleman, but not as an exclusive clergyman; the marked praise must surely have hurt his feelings. But to make a *moral and religious* question of the subject of tithes, seems to me the grafting of hypocrisy on the stock of cant.

For *where is the moral and religious consideration among the lay tithe-owners?* In endeavouring to assist the agricultural interest in a commutation of tithe, I have wished to proceed on the pure principle of reform—*begin at home*. If some forty or fifty members of the Bath Agricultural Society, tithe-holders, could adopt a plan to *satisfy themselves* and their tithe-tenants; with what strength of reason could the Society present it to the Houses of Lords and Commons, many members of both which would already be convinced!

Again, we approach two august bodies, yet more individually interested in the business.

The question here is—how many members of both Houses do *not* receive tithes? and then if I were to make a division of respectability, of consequence, of influence, of interest (without meaning the least disrespect to any one), I shrink the *titheless* one to a body inconsiderable in number, opinion, and power. The commutation of tithes is, perhaps, *personally* as much a parliamentary question as any that is likely to occur. Take the Members of both Houses as a body, and the clergy; and two to one of the parliamenters to the clergymen receive tithes. Compare this value in proportion, and it is twenty to one. Is this, then, particularly a *clergy* question? That body has nothing to do but to obey the decision, rejoicing that it is a *lay-question*. Let the members of the Bath Agricultural Society reflect upon this

one point—"Whether the tithes of the country in general would have been at one-third their present value, if the laity had not been partakers of the profit, and taught the clergy their value."

And then another consideration may not be amiss, "If the whole of the tithes were in lay hands, whether the value would not be increased, and the grievance diminished."

In expressing my surprise that the persons most interested wish to throw the "onus" of agreeing to a compensation from themselves on a comparatively indifferent body, I have as yet confined myself to their direct and positive participation of tithes; but do not laymen indirectly and proximately also enjoy the present benefits, and thus again are vigilantly interested in any commutation? Are we not to give credit to all that we hear of agencies, sequestrations, attorneyships, &c. &c.? Be it so. Let me judge by my own confined knowledge; and, if it be *ex pede Hercules*, we have a giant here.

I may walk over the former ground, and ask every member of the Bath Agricultural Society to accompany me; and cannot I point out to them, among themselves, owners of the tithes of clerical impropiators, whose speculations *that way* would most vigilantly watch any mode of commutation? Then I could take a most admirable view of the commutation of tithes to the advantage of the clergy. Hardly the priest obtains a moiety of his rights:

the man of business calculates the value of his life, offers him a considerable sum of money that becomes both interest and principal, insures the impropiator's life, and makes cent. per cent. of his bargain. If then tithes were commuted, would the speculator so act? would not the clerical possessor be more likely to know, as well as to receive, the full value of his property?

Again; are there no great laymen, who dispose of a living with a stipulation (no matter direct or indirect) as to the tithes? and who, if a commutation were to take place, must give up a *great* equivalent out of their own property; instead of an annuity, which they have the means of fixing at a small rate. Can the Bath Agricultural Society *doubt* of these facts? I would willingly mention the names and the circumstances. It is to facts that I call the attention of you independent gentlemen, yet I refer to them no further, not willing unnecessarily to give one personal allusion; but let me call on you to investigate the subject among those most concerned. I cannot suppose, that, wishing for the commutation of tithes, you merely mean to abrogate clergy tithes; evil enough has already affected the community by their getting into lay-hands. Now, if a rich layman was to make the impropiator a compensation, and sell them out separately to the several tithe-payers, I have no doubt of the advantage to the clergyman, or the good bargain to the contractor, but wo to

the individual purchasers! Exchange of tithes, unless every one *in the first place* gains his own, will be an imposition on the community, and to the individual (to elevate our homely saying) it will be *εἰς τὸ πῦρ ἐκ κάρπυ.*

I am not one of the inhabitants of Batrachomia, who would pray to our political Jove to be rescued from the dominion of good King Log. I fear the rapacious stork. If we have a change of tithe government, there must be no king. It is not a mere *commutation* of tithes, it is an *annihilation* that is required. Investigate the subject, then, at the fountain head; converse, reason, and bargain with those interested; and do not fancy that those who have a *life-interest* are more tenacious of the present tenure than those who hold a *perpetuity*.

Wherever I can see large bodies of tithe-owners approach the Parliament, "we are willing to sell the tithes we hold from the land of others, and purchase those due to others *by the same rule*; and, if any one is unwilling to purchase, we have adopted a scale (as at present, the land-tax) by which a future owner may know the fair price;" I think the country may confidently look for the support of the Legislature, and the freedom of agriculture from this lethargizing weight.

REM ACUL

[*N. B.* It has been a general rule of the Society not to admit pieces into these volumes without the real names of the writers; but in this instance it has been determined to forego that caution. If, however, the sensible author should incline to favour the Society with his correspondence, in future, he is respectfully requested to annex his real name.]

Remarks on the foregoing Essay.

OF so great importance in the national agriculture is the operation of tithes, that the Society has from its commencement seen cause for devising and keeping in view their commutation. It has repeatedly offered premiums for the most eligible plans of accomplishment. Several, at different times, have been offered; and in some instances their ingenuity has been rewarded. But no plan has yet appeared, which has so far provided for all difficulties, and so balanced all interests, as to encourage the Society to adopt it, in an application to Parliament; and by Parliament only can any general plan be rendered effectual. But the Society may hope that some happier result will await the labours of a special Committee lately appointed to manage the correspondence under this head.

The Society cannot but feel desirous that their said Committee should conduct itself with all due respect to the character of the *clergy* as a body, and to their established legal interests. With the *jure divino* of former times, or with clerical dues *as such*, modern agriculture is not concerned ; but it concerns the general subject, that alleged disadvantages should be fairly discussed, and that blame should not be improperly imputed to any class of men. On this account the foregoing letter, addressed to the Society at large, has been judged proper to be inserted in this place ; and though some particular remarks of the writer might perhaps as well have been omitted ; and he might, in other parts, have used less positive language with equal force of argument ; exceptions are not willingly taken on that account. Every writer has his own peculiar style, and where offence is not intended, freedom of discussion is fair and desirable.

It must be conceded, and ought ever to be borne in mind, that the question of tithes is not a clerical question only ; and it is never, by persons of knowledge and candour, considered as such. More than *half*, by some good writers it is supposed that *two-thirds*, of the great tithes of the kingdom are in *lay* hands. With the *greater part* of the public grievance of tithes, then, the clergy have nothing to do. So far as *that proportion* is an impediment to agriculture, the claims of laymen alone are concerned. But it would be

an invidious business for this Society to entertain a question, which class of claimants, by its general conduct respecting commutation, has furnished the greatest proportional obstruction to the agricultural improvements; and perhaps it might be rather a matter of opinion, than of demonstrable fact. With such minor considerations, however, the Society has happily no call to intermeddle. It has embarked on the broad basis (obvious enough to the view of common experience) that *the want of established rules or principles of fair commutation of tithes at large is a great impediment to improvements in agriculture.*

There have appeared in the field of controversy, at different times, some few writers, attempting to prove that tithes are not *necessarily* an impediment; but the theoretic statements of those men, brought to the test of fact and experience, are found void of support; and must ever be so held by the most candid and sensible, even among claimants themselves. The arguments for that fallacious opinion are in substance these:

1. That tithes are a part of the *value* of the land; only payable to a second person, instead of the land-owner.

2. That if the land were let tithe-free, the tithe would still be included in the rent, and the taker of the land must pay *one-fifth*, or some proportion, the more to his landlord, on that account.

3. That therefore it is the same thing to the farmer, whether, in the first instance, he pay 50s. per acre to the land-owner, or 40s. to him, and 10s. to the tithe claimant,

This would be sound argument, if the whole business lay within those general terms of calculation; but the contrary is too evident to need the formality of proof.

By taking his whole bargain at a fixed annual sum, the farmer has only one party to account with, only one interest to satisfy; and whatever be the return for his industry, skill, and expense, he knows nothing of the uncertain drawback of a tithe-claimant during the whole term of his lease. But where a farm is liable to tithe, the claimant has the option of compounding, or not; and it is not to be expected, as the law now stands, that he should forego his rights, and not fix his own arbitrary terms. It is true that in some instances the power is far from being abused; but exceptions are frequent. The lands of the country are of various quality; and to bring them *all* into the most productive state of which they are capable, (which is the grand business of agriculture, where population *demand*s it,) vastly different modes of culture, and proportions of expense, should be employed. Instances are perpetually occurring, in which the first expenses of a valuable scheme of improvement would be so great, so disproportioned to a *first* return of crops, that if

a tithe claimant should take in kind one tenth of the produce, without having contributed any part of the cost, the farmer, instead of being a gainer, must be a considerable loser. The public indeed would be a gainer, through the medium of *both* cultivator and tithe-taker, who *together* would bring the whole improved produce into the market; but the party who had furnished the labour, ingenuity, and cost, must content himself as well as he could. It is in vain to say, as sometimes has been pretended, theoretically, that the cultivator will generally sell his remaining share at so much the higher price, as to reimburse himself. In order to do this, the share taken in tithe, or at least the extra produce, must first be annihilated, or taken out of the market. It may be said that this is supposing an extreme case; but it would be no uncommon one, if farmers were not naturally restrained by prudential motives; and extreme cases, numerously multiplied, must make an extreme aggregate grievance!

It is much to be regretted, that Parliament, or in another word, the landed interest, does not set in earnest about compassing the great business of establishing equitable laws of commutation; not only to aid the increase of produce, but for the sake of general harmony between lay claimants, and the body of tithe-paying cultivators, as well as for the ease and benefit of the clergy. The advantage of religious harmony in the national church has often

been pleaded ; and those who wish best to her interests have in general but one opinion, as to the favourable tendency of the proposed improvement.

The subject is of too great moment not to be kept seriously in view ; and this Society does not feel disposed to relinquish, in despair, so important a branch of its original objects. It wishes to promote the accomplishment of a general good, which it believes to be attainable, while it respects the rights of individuals, as they now legally exist, equally with the interests of the whole community.

On behalf of the Committee
of Superintendence,

WM. MATTHEWS.

Hetling-House, Sept. 1814.

ARTICLE XXVI.

*Extract from the Report of the Committee of
the Highland Society in Scotland, on Weights
and Measures.*

SIR,

THE very able Report from Scotland, on the subject of Weights and Measures, having, in the absence of most of our active members, been pu

into my hands for perusal and consideration, I have to remark thereon as follows.

The subject appears so important, and the report so interesting, that I think it desirable to include some account of it in the Society's volume, now far advanced in the press. Thus the subject may come before the members of this Society, as early and generally as possible ; and any steps of co-operation may in consequence be taken, which the Society as a body, or any of its public-spirited members, may think proper.

The Report itself, as a first publication of the proceedings of the Committee, is so extensive and able, that it would be almost desirable, for the sake of general information, to give it entire ; but as that would exceed the limits convenient for a quotation, and perhaps be otherwise objectionable, I shall propose such an abridgement as may give a general idea, and serve to excite further curiosity. That curiosity may be greatly gratified by the purchase of the Report itself, of the bookseller appointed to vend it, and whose Address is intended to be inserted at the end of this volume when procured.

“ Report on Weights and Measures, by a Committee of the Highland Society of Scotland, and of Gentlemen from the different Counties of Scotland, and from the Convention of Royal Burghs.

“ IT is known to all, that a vast variety of weights and measures prevails in Scotland, so as to obstruct commerce, and incommode men in their daily transactions with each other, in a great degree.

“ There is reason to believe, that there are great local varieties in England also. And the Committee are convinced, that few things would tend more to promote the interests of agriculture and commerce, and the general comfort of individuals, in the ordinary concerns of life, than a simple and uniform system of weights and measures throughout the British empire.

“ The utility and importance of establishing a general uniformity of weights and measures in Scotland having been urged at the General Meeting of the Highland Society of Scotland on 8th January 1811, a Committee was appointed to consider how far and in what manner the Society could contribute to the attainment of that object. That Committee gave in a report, stating, among other things, that in their opinion nothing effectual could be done without the concurrence and support of the counties

and royal burghs. The Society took this report into consideration at their next general meeting on 1st July 1811, and ordered it to be communicated to the counties, and to the convention of royal burghs, signifying the Society's readiness to co-operate in any way that may be thought advisable. In consequence of this intimation, a meeting was held in Edinburgh, in the Highland Society Hall, on 25th November 1811, consisting of a number of landed gentlemen from the different counties, to whose attention this matter had been recommended; of several members of the committee of the Convention of Royal Burghs; and of the committee of the Highland Society. That meeting appointed the present Committee to enquire and report what were the existing standards of weights and measures in the three kingdoms; what standards it was most advisable to adopt for Scotland; and what regulations might be necessary for establishing, and preserving in use, the standards to be recommended; with any other points which might occur connected with the subject. This Committee met soon afterwards; and parcelled out the various branches of the subject among different Sub-Committees, who have since furnished very elaborate reports. From these the Committee now proceed to give a general report on the matters remitted to them.

“ It seemed necessary, in the *first* place, to ascertain what were the existing standards of the three

kingdoms;—of *Scotland*, for reasons too obvious to require being mentioned;—of *England*, because it was thought highly probable that it would be advisable to adopt these; and because, in the event of the equalization being taken up as a general measure over the island, there was no doubt that they would be preferred;—and of *Ireland*, that it might be known how they stood, and in case it should be proposed that the measure shall be made generally applicable to the united kingdom, which was considered highly desirable, if it should appear practicable.”

[Then follows a copious account of the *legal standards* of weights and measures, in Scotland, England, and Ireland, with explanatory notes, historical and very important.]

“ Having now seen what are the standards used in the different parts of the united kingdom, and in the collection of the revenue, the next thing incumbent on the Committee, is to state, whether, in their opinion, it would be more advisable to adopt the Scotch or the English standards; and whether under any and what modifications?

“ It would at first sight appear, as if no room were here left for doubt or hesitation, the injunction in the Articles of Union seeming to preclude all deliberation on the subject. But it has already been observed, that there does not exist in the practice, nor even, accurately speaking, in the law of England,

any universal and uniform standard of weights and measures ; and therefore the wonder ceases, that the Articles of Union, as to this point, have never yet been enforced ; and that it remains, after the lapse of more than a century, to enter upon the present discussion.

“ It cannot, however, escape attention, that the injunction in the Articles of Union would oppose a very formidable obstacle to any measures for obtaining from the British Legislature a statutory establishment of standards enacted in Scotland before the Union, and partially continued since that time in practice ; and yet it is undeniable, that uniformity of practice will be looked for in vain, unless in consequence of legislative interference.

“ It is at the same time a very material consideration that the Scottish standards are in several respects very inaccurate ; and in one striking particular, highly inconvenient ; namely, that the measures, even passing under the same name, are by law directed to be made of different sizes, for different sorts of grain.

“ The result to which the Committee have come, is to recommend the English system of weights and measures for adoption in Scotland, not however absolutely, and without exception, but as the basis of a new set of regulations on the subject.

“ Among the reasons on which this determination is founded, the following may be enumerated :—
The great, and increasing, and highly valuable, com-

mercial intercourse between England and Scotland, which has already introduced, in many parts of Scotland, an acquaintance with the English weights and measures, and a pretty general use of them; and of which intercourse the progress will be accelerated by the uniform adoption of these:—The establishment in practice over the whole of Scotland, in various branches of traffic, of the avoirdupoise weight, the common customary weight of England:—The use of the English system in the collection of the revenue throughout the island:—The general disposition in favour of it testified by a large proportion of the people of Scotland, and particularly by the most eminent commercial bodies; and, above all, the hopes which may be indulged of a complete uniformity as to the weights and measures, both in law and practice, being attained, either now or hereafter, over the whole British empire; hopes which cannot but be strengthened by the resolution now recommended.”

[Here follow elaborate details of English weights and measures, now in use, with proposals for certain modifications.]

“ Having stated what occurs to them with regard to the choice of standards, the next thing incumbent on the Committee is to ascertain the best method of constructing and checking the standards recommended. This was a subject on which the Committee did not think themselves qualified to judge;

and therefore applied to Professor Playfair, who, with the utmost cordiality and readiness, agreed at once to afford his valuable assistance.

“ The Committee accordingly furnished Mr. Playfair with the sub-reports, the substance of which has been stated in the preceeding part of this report, with the reports of the Committee of the House of Commons, and other materials, requesting him to state the best mode of constructing and checking the standards recommended by the Committee. The learned gentleman has since favoured the Committee with a very ingenious paper, not confined to that point, but embracing the whole subject. This paper the Committee give entire in the Appendix, (No. 2.)

“ The Committee have to regret that their report, on the choice of standards, differs in some particulars from what is recommended from so high and respectable authority ; and have considered the points upon which a difference occurs, with the most anxious attention.

“ With regard to the plan of *decimal division* proposed in Professor Playfair’s Report, it is impossible to hesitate a moment in admitting, that were we deliberating about the first formation of a system, the reasons in favour of that patronized by the learned Professor would be found unanswerable.”

[The reasons afterwards assigned by this able Committee for questioning the practicability of Mr.

Playfair's scheme are of considerable weight; but there is ~~an~~ originality and masterly simplicity in the learned Professor's ideas, which may well entitle them to be recorded in this Society's volume of correspondence, and documents of useful knowledge. It is therefore extracted *verbatim* as follows.]

Sketch of a Plan for establishing Uniformity of Weights and Measures throughout Scotland.

[By Professor PLAYFAIR, of Edinburgh.]

“ THE problem of establishing an uniform Standard of Measure and Weight may be understood in two different senses. According to one, it is required to fix an immutable standard, taken from one of those quantities which nature preserves, of the same magnitude in all places, and in all ages of the world. According to the other view of the matter, it is permitted to assume a standard purely conventional or arbitrary, so as to suit the circumstances of a particular age or country; taking care, at the same time, to compare it with some of the immutable quantities above referred to, so that it may be communicable from one place or one age to another, without the actual transmission of the body which bears the impression of it. In either case, one unit being fixed, all the other measures of length, superficies, solidity, and weight, are to be derived from it, by such simple rules as may be easily remembered and easily carried into practice.

“ The problem, in the first of these senses, after having been long viewed in speculation, and considered as involving a thing greatly to be wished, but never likely to be attained, has been lately resolved in the most complete and practical manner, by the philosophers of France. The method they have pursued does infinite credit to their skill and accuracy ; and as it is perfectly free from all the peculiarities that would adapt it more to one country than another, we have no doubt that it will in time be universally received among all civilized nations. If indeed the question were simply what is now the best thing for a nation to do, with respect to a standard measure, I would have no hesitation to say, that it is to adopt the French system at once, and *in toto*. This, however, in the present condition of the world, is hardly to be looked for ; and therefore it may be expedient to consider the question in the second of the senses above adverted to ; and though the solution so obtained will be less perfect, and less beautiful in theory, it may for practical purposes be nearly of the same utility, and may remove the perplexity and confusion which are here so generally complained of.

“ It is to the question, in this last view of it, that I conceive the attention of the Highland Society, and of the Committee which has done me the honour of requesting my opinion, to have been turned. The manner in which it may be resolved with as little deviation from established custom as possible, it is the object of this Memoir to explain.

“ Of the Standard of Linear Measure !

“ In consequence of a diligent and accurate research made by the late ingenious Sir George Shuckburgh, four

Standards of Longitudinal Measure were discovered in London, all of considerable authority, and not very materially different from one another. One set of these measures is preserved in the Exchequer, another in the House of Commons, the third at the House of the Royal Society, and the fourth in the Tower. The first of these alone bears legal authority ; it has been in use for more than 200 years. The Standard in the Tower is a copy from it, and requires no particular consideration. The two remaining ones are of a modern date ; and though they have not the authority of a statute, yet from the high reputation of Graham and Bird, the artists by whom they were constructed, they are entitled to great respect, and are probably a mean derived from the old Standards in the Exchequer, which are not themselves very consistent with one another. See Sir George Shuckburgh's paper, *Philosophical Transactions*, 1798, page 166.

“Of the two standards just mentioned, that which is in the House of Commons was constructed by Mr. Bird, and was fixed on by a Committee of that House, which sat in 1758, and which did much to the establishment of an universal measure. It is a brass rod about 39 inches long and an inch square, enclosed in a mahogany frame, and inscribed, ‘Standard, &c. 1758.’ Near each end of it is a gold pin about one-tenth of an inch in diameter, with a central point marked on it, and these points are distant exactly 36 inches. This scale is not divided. Sir George Shuckburgh compared this standard with one which Mr. Troughton had constructed, and had divided with incredible accuracy, for the purpose of comparing longitudinal measures with one another, and found it to exceed this last only by 23 of the hundred thousandths of an inch ; a quantity so inconsiderable that it may be

entirely neglected. We may suppose, therefore, with Sir George, that Mr. Bird's Parliamentary Standard corresponds exactly with Mr. Troughton's scale ; and these, therefore, or either of them, we would recommend as the standard of linear measure now to be adopted. They have the sanction of the Committee of Parliament, which did so much towards the solution of the present question; and they have the advantage besides of having been compared with the length of the pendulum by Sir George Shuckburgh, and more lately with the metre of the French philosophers, determined from the measurement of degrees of the meridian. Mr. Troughton constructed three of these scales, all of the same exquisite workmanship, and perfectly equal to one another. One of these was the property of Sir George Shuckburgh, and is now in England; another is in the possession of Professor Piçet of Geneva, and is now at Paris; the third we are so fortunate as to have in Scotland, in the possession of Professor Copland at Aberdeen. Sir George Shuckburgh also instituted a comparison between his scale and the difference of two pendulums, the one performing 84, and the other 42, vibrations in a minute of mean solar time in the latitude of London, and at the temperature of 60 degrees. He found this difference to consist of 59,89358 inches of his scale; and hence it is easy to compute, that a pendulum vibrating seconds in the above situation is 39,12797 inches of the same measure.

“ By Professor Piçet's scale it was found, that the metre as engraven on the Platina Standard preserved by the National Institute, is 39,382649 inches of that scale ; and hence the proportion of the Standard Yard to the French Metre, or to the ten millionth part of the quadrant of the meridian, is that of 1 to 1,0939264. Thus the

quadrant of the meridian which is 10,000,000 metres, is 10,939,961 yards of our standard; and in this way the length of our standard is rendered no less communicable than the length of the French metre. We have however to observe, that though we believe the comparison with the metre to be perfectly correct, we apprehend that new experiments are necessary for the comparison with the length of the seconds pendulum, those of Sir George Shuckburgh not having attained all the accuracy that he himself wished them to possess.

“ Having thus fixed on what seems to us a very unexceptionable Standard of Linear Measure, the manner of dividing and multiplying it is next to be considered. Here there can be little doubt that the decimal division of the foot is preferable to all others. The great advantage in arithmetical computation, and the great saving of time and labour which are the necessary consequences of such division, are obvious at first sight; and in a state of society where there are so many contrivances for saving the labour of the hand, it is reasonable that one should be adopted for saving the labour of the mind. There can be no doubt, indeed, that such an expedient would be found of the greatest utility; and would soon compensate, even to the individuals of the present generation, for the small inconvenience which a departure from ordinary custom might at first involve, beside conferring a permanent benefit on all future generations. Whether it be practicable to introduce the decimal divisions throughout may be doubted; but in the case of linear measure, it could hardly be attended with any inconvenience. The foot, or the third part of the preceding standard, might be divided into 10th, instead of 12th parts; and these, in allusion to the number of the

fingers, might be termed digits; a word which is applicable with more propriety to decimal than to duodecimal divisions.

“ It would perhaps be more difficult to introduce the decimal multiplication of the foot for the purpose of Itinerary Measures: the furlong, the mile, the league, would in this way turn out to be of dimensions so very different from those at present in use, that the change would be attended with a degree of inconvenience, which, though only temporary, is probably too great to be admitted. We shall therefore suppose the old itinerary measures to be retained. In what follows too, where we have occasion to employ the divisions of the foot, we shall suppose them to be inches; it being easy, if the decimal division shall be adopted, to make the necessary changes.

“ Of Superficial Measure.

“ The Acre, the largest Superficial Measure in use with us, may continue to be derived from the foot just as it is at present; that is to say, a square described on a line of 22 yards or 66 feet in length, is to be reckoned the 10th part of an acre, or to make an acre when multiplied by 10. A chain of 66 feet in length therefore may, as at present, be divided into 100 links; and thus the whole calculations of surveying will remain as they now are. We would, however, propose to suppress the denominations of roods, poles, &c.; and to express all measures of inferior magnitude, simply as decimals of an acre. This, however, may be left for future consideration.

“ In all this, we have supposed the English acre to be adopted in Scotland; and we shall throughout consider the measures of the two kingdoms to be the same, as they are

required to be by the Articles of the Union. The English acre is already adopted in a great part of Scotland; and where it is not, it will be necessary to have accurate tables, or rules, for the reduction of the ordinary Scottish acre to the English. Having lately obtained, by means of Professor Copland's Standard, an exact comparison between that standard and the Scottish ell, preserved in the Dean of Guild's office at Edinburgh, we have now the means of giving this rule with perfect exactness.

“ Of Cubical Measure, or Measure of Capacity.

“ This is a subject of more difficulty than the preceding, and requires of necessity more changes to be made. Concerning the Measures of Capacity which now exist, the proceedings of the Parliamentary Committee of 1758 furnish ample information. We learn from thence, that there are at present four different bushels, all authorized by statute. They are the following:

Standard bushel 1601	- - - - -	2124 cubic inches.
Bushel of King William	- - - - -	2150
Bushel deduced from the gallon 1601		2168
— from the quart of ditto	- -	2240

“ To these four, of which the medium is 2170 $\frac{1}{2}$, the Parliamenaary Committee would add a fifth of 2256 cubic inches, founded on the gallon of 282 cubic inches, which it proposes to adopt. In the midst of so much diversity, there seem only two principles to direct our choice. The one is to depart as little as can be conveniently done from the medium quantity, and the other is to adopt such a magnitude for the bushel as can be easily derived from the foot; or such, that a vessel of the required magnitude may easily be constructed without in-

volving small fractions of a foot in its dimensions. Now of the above measures, 2168 is the nearest to the medium; and if we take 8 from it, making it 2160, it becomes ten times the cube of the number 6. We propose, therefore, that the bushel should contain exactly 2160 cubic inches, or ten times the cube of 6 inches.

“ In this way, the construction of the Bushel is extremely simple. Take a line of half a foot, and describe upon it a cube; ten times this cube is a bushel. In like manner for the Gallon, or the eighth part of the bushel take the line that is half the former, or a line of 3 inch and describe upon it a cube; ten times this cube is a gallon, or 270 cubic inches.

“ In this way, there is no departure of consequence from the established measures; and indeed there is no number that could be assumed, that would not give an equal or a greater departure from some measure of legal authority. The great simplicity with which the bushel and the gallon now proposed are derived from the line standard, is a recommendation which must do much more than balance any inconvenience that can arise from other circumstances.

Making the bushel to contain 2160 cubic inches;

the peck will be	=	540
the gallon - -	=	270
the quart - -	=	67½
the pint - -	=	33¾

“ The Parliamentary Committee appears to have considered it as of some advantage to have the cubic inches in all the inferior measures, expressed in whole numbers and for that reason, was willing to adopt 280 for the gallon; though other considerations induced it to fix at last on 282. The truth however is, that to have

quart and pint, &c. expressed in integer numbers, is a matter of little consequence, as contributing hardly any thing either to facilitate the construction of the Measure practically, or the computation from it numerically. The thing that is of real consequence, is to have the side of the cubical measure expressed in a whole number of inches. This, with respect both to the Bushel and the Gallon, is effected in the present case; and it could not be effected in the other measures, without adopting a different division both of the Foot and of the Bushel. A division or multiplication of linear measures continually by 2, and of measures of capacity continually by 8, is the arrangement that would best answer this purpose.

“ The Parliamentary Committee laid it down as a maxim, that there should be no distinction between dry and liquid measures; and we conceive, that in every system that aims at uniformity, this maxim must be received. The formation of a Cylandric Measure to contain precisely a bushel is of consequence in practice, as such measures are generally employed. If a cylinder be made 18 inches in diameter, and of the depth of $8\frac{1}{2}$ inches, it will contain a Standard Bushel, but will be somewhat too great; it will exceed the truth by about one quarter *per cent.*; or, more exactly, by one in 424. Other dimensions that may come nearer, without involving small fractions of a foot, will probably be found.

“ Of Weight.

“ As the things to be compared under this head are not mere portions of space, another element must be taken into consideration. A substance that does not vary in weight, while its bulk continues the same, must, if possible, be found; so that a given bulk of it may serve

as an unit, or standard, with which all other weights are to be compared.

“ The substance which first offers itself as possessing this property is Water; and the most scrupulous examination shews, that of all substances it is the best accommodated to the present purpose. All experience proves, that water, when freed from impurity, and when of the same temperature, has nearly the same specific gravity everywhere, or is bulk for bulk of the same weight. This cannot be said of almost any other substance. The Parliamentary Committee was inclined to recommend gold as the proper standard. But gold is not always of the same specific gravity; so that if it were to be employed as the standard, the same identical mass must always be had recourse to. Now, this is precisely the circumstance that we would wish to avoid; the identity of the mass forming a very inconvenient restriction, and preventing the standard from being easily communicated. It makes an interruption likewise in the connection that should subsist between all the different standards and the standard of length. The facility of finding water everywhere, and the care that nature has taken to preserve that valuable element in all places nearly of the same quality, is a recommendation far above every other, and makes it, for our purpose, more valuable than the most precious of the metals.

“ Another circumstance, purely accidental, and which must be reckoned among the number of fortunate coincidences, enables us to employ water for our standard, with very little alteration of the weights presently in use. It has been long since remarked, that a cubic foot of water weighs nearly 1000 ounces, 16 of which make a pound Avoirdupois. Of consequence, the cube of a digit,

or of the tenth part of a foot, is the bulk of water equal to an ounce weight. Now, if it shall be determined by statute, that a standard ounce is to be the weight of the above measure of water of a given temperature, it is obvious, that a Standard of Weight is fixed, having all the properties requisite for such a standard, and deviating hardly in a sensible degree from the weight that is now used.

“ The temperature of the water must be assumed, so as to be one fixed in its own nature, and having no dependence on the arbitrary divisions of a thermometer. The temperature of water just freezing has this requisite, as it is uniform, and always easy to be had recourse to. The standard ounce ought therefore to be the weight of the 1000th part of a cubic foot of water of the temperature of freezing.

“ As the temperature of freezing may be inconvenient to work with in the experiments, any other temperature may be used ; taking care, however, to reduce the specific gravity of the water to the temperature of freezing, by making such allowances as are perfectly well understood by those who are conversant with matters of this kind.

“ This standard being once established, we may proceed to arrange the other weights, either according to the method of the Avoirdupois, or the Troy weight, or any other that may be deemed preferable ; and, keeping this in view, that one system only is to be employed, in exclusion of all others. If the Avoirdupois weight is adopted, the cubic foot of water will be precisely equal to $62\frac{1}{2}$ pounds. If the Troy weight is employed, it will be equal to $83\frac{1}{3}$ of such pounds. In both cases the *grain*, or the smallest weight to which a particular name is given, might be reckoned, as at present, the 480th part of an

ounce. It would seem best, however, to employ only one kind of pound. Perhaps the following arrangement, which is purely decimal, and would make the grain only the 1000dth part of an ounce, might be found to have some advantages. The ounce being determined as above, and the 1000dth part of it taken for a grain,—then

10 grains	=	one scruple.
10 scruples	=	one drachm.
10 drachms	=	one ounce.
10 ounces	=	one pound.
10 pounds	=	one stone.
10 stones	=	one hundred.
10 hundreds	=	one thousand.
2 thousands	=	one ton.*

“ If such an arrangement were adopted, it might be found necessary to employ new names for such weights as differ much from the old ones of the same denomination. This, however, is given as a mere *projet*. The Standard pointed out above is equally applicable, whatever rule be employed in the division or multiplication of it.

The preceding Scheme, or any other that may be thought preferable, being adopted and sanctioned by an Act of the Legislature, two things will still be requisite in order to give it full effect. The first of these is the construction of the standards with the greatest care and accuracy ; and for this purpose, the best artists, or those most skilful in making mathematical instruments and philosophical apparatus, must be employed. We have seen that the Standard of Linear Measure is already con-

* The ton, or a weight nearly of such an amount, has so obvious a connection with the greater load which a horse is able to draw, that it is thought proper to introduce it, though a departure from the decimal arrangement.

fructed in the most perfect manner, and so that other measures can be most accurately compared with it. The construction of the Measures of Capacity and of Weight still remains, and is a work of considerable difficulty. When the simplest thing is to be done with the utmost correctness, it is no longer easily performed; and the very best workmen must be employed to make the prism or the cylinder, that shall precisely contain a cube of the standard measure, or of the half or tenth part of that standard. We may, however, suppose all this to be accurately performed, London now affording artists, of the kind that are here wanted, superior to any other in the world. When these standards, which are to be the models for all the rest, have been once constructed, those that are to be used for common purposes may be committed to the care of inferior artists.

“ The other circumstance to which we refer, is the construction of Tables, by which the Old Measures may be reduced to the New in all cases whatsoever. The great local irregularities that have arisen, either from want of care, or injudicious regulations, in all that regards measures and weights, must necessarily render these reductions considerably various and complicated. These reductions, however, will in all cases be resolved into experiments that are easily made, or numerical calculations founded on very simple principles, and requiring only a little exertion of time and patience. In order to facilitate these calculations, a general table might be previously prepared, reducing the cylindric or other measures used for bushels, gallons, &c. of every dimension, within certain limits, to the standard bushel or gallon that has been adopted. Suppose a cylindric bushel, for example, 17 inches in diameter and 9 inches

in depth, the proposed tables might give from inspection the multiplier, which would reduce any number of such bushels to true or standard bushels ; and, conversely, the multiplier that would reduce any number of the latter to the corresponding number of the former. The same might be done for all other dimensions assumed hypothetically between the utmost limits to which even bushels of the most inaccurate construction can reach. This table might also give the logarithms of the multipliers, for the sake of those who are conversant with that species of calculation. From this general table the reductions required in any particular district might with very little trouble be deduced. Some inconvenience, no doubt, would be occasioned for a year or two at first ; but it would quickly cease, and the advantage would become sensible to every individual.

“ If any reformation of this kind shall ever come under the consideration of Parliament, one maxim cannot be too strongly urged, viz. that in appointing the Standards, it is necessary to adhere strictly to one simple and general view, without departing from it for the sake of accommodating individuals, or particular classes of the community. The advantage of the public at large cannot be consulted, unless this rule is rigorously observed. The measures and weights, for example, employed in the collection of the revenue may be found to differ considerably from the standards that shall be fixed on ; and it might be thought advantageous, by changing the latter, to bring them nearer to the former. The simplicity and accuracy of the system, however, would in this way be sacrificed ; for it may be considered as certain, that unless the rules are simple, and the constructions independent of minuteness of division, an opening will be left for incor-

tinually: not that the evil, in a moral point of view, is demonstrably so great as some writers have supposed; it may be chiefly regarded as troublesome and disgraceful to an enlightened nation.

Notwithstanding forty-five different enactments on the Equalization of Weights and Measures, from *Magna Charta* downwards, the greatest inequalities continue to prevail. So late as in 1758 and 1759, ineffectual attempts were made in Parliament on the subject; and more recently, in 1790, Sir John Riggs Miller, one of the Vice-Presidents of this Society, brought the topic again into the House of Commons; but gained so little assistance in the progress of his undertaking, that he gave it up in despair. Let us, however, hope that a period will soon arrive, when men of talents and consequence in the Senate (for by them it must, if ever, be done) will unite, to surmount the difficulty, and do away such an inconvenience and discredit from their country.

WM. MATTHEWS.

Bath, Sept. 1, 1814.

TO THE SECRETARY.

ARTICLE XXVIII.

On the Management of Coppice Woods.

[To the Superintending Committee of the Bath and West of England Agricultural Society.]

GENTLEMEN,

IN 1792, my honoured Father's "*Observations on the Management of Woods, &c. in the Western Counties,*" gained him a liberal premium from your Society, and were published in the 7th volume of their papers. That essay contains a valuable fund of information and advice; but my own opinion on the "*nature of the growth of Underwood, and cause of its decay,*" differs materially from my father's statement at that period. I would wish to explain myself openly; but I hesitate to offer my sentiments to the public under such circumstances. Relying, however, on the scrutiny of that office you have undertaken, I feel confident that my motives will not be misinterpreted.

The stocks or stools which produce Underwood or Coppice Wood, have been compared to "*pollard trees growing under ground.*" I think this comparison holds good to the *roots of trees*, but not to their heads;—that the produce of those stocks must be the most abundant, when the *parent roots* are in

the greatest perfection ;—that under the *common* management of coppice woods the produce must be small, until the stocks attain a state which is there called *perfection* ;—that when they are past *that* perfection, they gradually decline ; the shoots become weaker at every successive cutting, and the stocks finally decay and die!

In order, therefore, to prevent the decay of woods, my principle will be to preserve and renew a *due succession of roots*, to supply the places of those which from time to time are worn out or destroyed. In woods, as in water meadow, the main object should be the *production of roots* : this is the only mystery ; for *with these*, plants are certain ; and the practice is easy, with early attention to the management. I begin with a healthy sapling, for such should be the parent stock of all descriptions of underwood. This should be cut down at not more than fourteen years old, *as close to the ground as possible*, and the surface of the stock, cut diagonally or in angles, should be left quite smooth and clean. The shoots from such stocks will be few, but strong and vigorous ; which, as they grow out of the ground, will *throw out new roots* for their own support, and for the renewing of underwood hereafter. On subsequent cuttings a like process should be observed, of felling every pole *home to the surface* of the land, and of leaving the stroke of the hatchet apparent on the stocks ; which should in all instances be cut *upwards* with

the full strength of *both arms*, leaving the rind or bark with a smooth but irregular edge cut in different angles. The stools are in this state less liable to injury by weather, and consequently the new shoots will be stout and healthy. It will be found that this practice conduces much to the growth of new saplings and suckers; and it is particularly recommended to keep the ground as thickly covered as possible, without thorns or brambles.

Coppice Woods are capable of bearing much greater produce than they commonly afford; and the poles will be strait and clean, in proportion as they grow close together. Woods may be filled up by *laying* some of the branches of stools at 7 to 10* years old; merely plashing them, and laying them under ground, with openings where shoots are required; *avoiding* both in the coppices and the hedge rows the *vile* mode of plashing, by merely bending the branches towards the land they grow upon. Hazel, willow, birch, and alder, will bear laying: ash will frequently fail.

In support of this system of management, which differs from the general practice of the Western Counties, I will state a few observations which doubtless have occurred to others, and which I think applicable here.

* Would not this operation be better performed, generally, at an earlier age? An experienced Member of the Committee is of opinion, that the earlier the better, after the shoots have attained sufficient length.

1st. In cutting *thorn-hedges* the new shoots invariably grow out of the stock immediately below the stroke of the hook ; consequently, if cut a foot above the bank the hedge becomes thin at bottom, and the stock having a multitude of branches to supply, without increase of roots, becomes in time too weak to support its produce. But if these thorn plants be cut close to the ground, and earthed up, the new shoots will *arise from under ground* ; will throw out new roots as they grow up ; and will draw support from the bank in the way I have mentioned, thereby making a fence impenetrable.

2dly. *Elm trees* in a hedge row are frequently united in their roots at a distance of fifty yards and upwards. Suckers may be taken from them ; and when planted young with quick hedges, cut off in the same manner, will become thriving timber. On the felling of an old elm in grass lands numerous saplings arise around the parent trunk : this is too evident not to be known generally ; but it may not be so readily admitted, that in coppices many other kinds of trees grow up from the fibrous roots of timber cut near them. In woods under my own management, I have for many years clearly proved this with *able, birch, beech, and oak*, at the distance of many feet from the stools of trees which may be deemed their origin.

3dly. But perhaps my principle will be best explained and supported by stating my practice of *raising alder and birch*. The stool, which in the

old coppices stands perhaps 12 to 18 inches high after the lopping, is at the first or second winter *earthed up* so as cover a few inches of the lower part of the young shoots. These shoots will instantly throw out *new roots*, and may at the end of one year be severed from the parent stock in a state which will ensure their growth, as *new plants* in a new situation.

The object of this letter being merely to *correct an error*, which I sincerely believe my father latterly saw, and meant to have corrected himself, I refer the young planter to the original essay of 1792 for his guidance in the management of woods. But I cannot conclude without impressing strictly the necessity of attending to two main objects, viz. to drain, with deep and well-appointed trenches, all wet places intended for the growth of timber or underwood; and to secure young shoots of both from the bite and tread of cattle. Hares and rabbits, if numerous, will do incalculable injury, and should be kept down as much as possible.

A small portion of time *well bestowed* will suffice for the care of a large tract of woodland; but a total neglect of such valuable possessions will occasion as much waste as can be committed in agriculture.

I have the honour to be, Gentlemen,

With much respect,

Your very obedient servant,

Sept. 5, 1814.

THOS. DAVIS.

ARTICLE XXVIII.

A List of the Premiums and Bounties adjudged by the Society, at the Annual Meetings since the Publication of the 12th Volume, viz.

At the Annual Meeting in 1810.

£. s. d.

TO Charles Gordon Gray, esq; for		
exhibiting a Ram and five Fat		
Shearling Wethers, of the new Leicester		
Breed, a premium of	-	- 21 0 0
To Mr. R. Reynolds, for exhibiting a		
Sample of his Stock of Heifers of the		
true Devon breed, a premium of	-	10 10 0
To ditto, for exhibiting a Fat Cow of the		
same breed, a premium of	-	5 5 0
To John Blackburrow, esq; for exhibiting		
two Fat Oxen, of his own breeding, a		
premium of	-	10 10 0
To Mr. George Watts, for exhibiting a		
Fat Steer, a premium of	-	5 5 0
To Mr. Kemp, for exhibiting a Fat Cow		
of the Hereford breed, a premium of	10	10 0

	£.	s.	d.
To R. C. Paul, esq; for exhibiting a Fat Heifer of the Durham breed, a premium of - - - -	3	3	0
To Mr. Brook, for exhibiting a remarkably fine Heifer Bos, a bounty of -	3	3	0
To Henry Wansey, esq; for exhibiting a Pen of Ryeland Ewes for breeding, a bounty of - - - -	5	5	0
To Mr. Robert Hughes, for exhibiting a Boar Pig and his offspring, a bounty of	4	4	0
To Mr. Wilcox, for exhibiting two Fat Ewes of the Leicester breed, possessing extraordinary merit, a bounty of -	6	5	0
To Mr. Isaac Kendall, of Hazel-Farm, the first premium for Ploughing at the late Ploughing Match - - - -	10	10	0
To John White, the Ploughman - - - -	2	2	0
To the Driver - - - -	0	10	0
To George Pritt, esq; of Compton-Martin, the second premium at ditto -	6	6	0
To James Lovell, the Ploughman - - - -	1	1	0
To the Driver - - - -	0	5	0
To Mr. Isaac Kendall, for Clean Crops of Turnips and Cabbages, a bounty of	5	5	0
To ditto, for Ploughing the greatest number of Acres with two horses only, a premium of - - - -	5	5	0
To B. Gray, jun. esq; for ditto with two Oxen only, a premium of -	5	5	0

	£.	s.	d.
To John Gordon, esq; for manufacturing a piece of Uniform White Kerseymere from Wool grown in England, ditto	5	5	0
To the Right Hon. Lord Viscount Castle- reagh, as Grower of the Wool, 'a bounty of - - - - -	3	3	0
To the Walcot and Lambridge Female Friendly Society, a premium of -	10	10	0
To Thomas Triggol, for great care and skill in Rearing Lambs, a premium of	3	3	0
To Thomas Ashcombe, of Chisledon, Wilts, for 26 years faithful Servitude in Husbandry, a premium of -	3	3	0
To Benjamin Reynolds, of Everly, Wilts, for 35 years ditto, a premium of -	3	3	0
To Wm. White, of Bathford, Somerset, for 17 years ditto, a premium of -	3	3	0
To Wm. Miller, of Bishopstrow, Wilts, Labourer in Husbandry, for bringing up Ten Children without parochial aid, a premium of - - - - -	3	3	0
To Stephen Thrasher, of Over-Stowey, Somerset, for bringing up Nine Chil- dren without parochial aid, a premium of	3	3	0
To Benjamin Cray, for exhibiting ten Varieties of Potatoes raised from seed, a premium of - - - - -	5	5	0
	£	165	0 0

	£.	s.	d.
To R. C. Paul, esq; for Ploughing the greatest quantity of Land, with two horses only - - -	5	5	0
To Mr. Wilcox, for breeding and keeping the greater number and most profitable flock of Sheep - - -	10	10	0
To T. Smith, esq; for great Merit in a similar claim, <i>a Silver Bedfordean Medal</i>			
To Lewen Tugwell, esq; for various Im- provements in the Mechanical Line, <i>a</i> <i>Silver Bedfordean Medal</i> - - -			
To Benjamin Gray, esq, for working with Neat Cattle, a bounty of - - -	5	0	0
To his Ploughman, a bounty of - - -	2	0	0
To his Driver, a bounty of - - -	0	10	0
To Thomas Williamson, esq; for exhib- iting sundry Mechanical Devices, a bounty of - - -	3	0	0
To Mr. Sandell, for exhibiting a rotative Mangle, of excellent construction, a premium of - - -	5	5	0
To Mr. Box, for Cultivating the White Poppy, a premium of - - -	6	6	0
To T. W. Dyke, esq; for the Draft of a Lease, a premium of - - -	10	10	0
To Mr. Banks, for a Model of a Bust of the late Mr. Billingsley - - -	10	10	0
To Michael Western, for 18 years faith- ful servitude - - -	3	3	0

	£.	s.	d.
To Mary Gay, the first premium for			
Hoeing Turnips - - -	2	2	0
To Margaretta Bartlett, the second ditto,			
ditto - - -	1	1	0
	£133	17	6

At the Annual Meeting in 1812.

To the President, Sir B. Hobhouse, bart.

M. P. &c. &c. as a token of the respect and gratitude of the Society, for the exercise of those talents during seven years Presidency, which, together with numerous Communications, have essentially promoted the welfare of the Society, and are calculated to further those objects by which individual and national prosperity may be advanced, *a Bedfordean Gold Medal* - -

To Wm. Dickinson, esq; for the cultivation of Fiorin Grass, a premium of - 21 0 0

To Thomas Williamson, esq; (of Writhlington Agricultural College) for an Essay to promote the health, morals, and happiness of manufacturers, &c. a bounty of - - - 10 10 0

To Mr. Falkner, for Ploughing, a premium of - - - 6 6 0

	<i>£.</i>	<i>s.</i>	<i>d.</i>
To his Ploughman, (exclusive of Coat and Buttons,) a premium of	-	1	1 0
To Mr. Garrett, for Folding Sheep in the day in the hot summer months, a premium of	-	5	5 0
To R. C. Paul, esq; for raising a crop of Turnips for spring feeding, by the Northumberland Culture, a premium of	10	10	0
To Gabriel Stone, esq; for the best sample of Neat Cattle for breeding, a premium of	-	10	10 0
To J. R. Lucas, esq; for the best lot of Breeding Ewes, of the Merino Cross, a premium of	-	10	10 0
To Mr. Marshall, for the best lot of Breeding Ewes, of the Leicester breed, a premium of	-	10	10 0
To Mr. Smith, for the best Fat Ox, a premium of	-	10	10 0
To Gabriel Stone, esq; for the best Fat Heifer, a premium of	-	10	10 0
To C. G. Gray, esq; for the best Fat Steer, a bounty of	-	5	5 0
To Mr. Marshall, for the best Fat Wether Sheep, a premium of	-	6	6 0
To Mr. Hayward, for the second best ditto, a bounty of	-	3	3 0
To Mr. Isaac Kendall, for exhibiting a Bull, Cow, and offspring, a bounty of	5	5	0

To Mr. Clement, for a fat Pig, a bounty of	£.	s.	d.
To B. Gray, esq; for Rearing Pigs, a premium of	2	2	0
To —, for exhibiting a Model of a Machine for raking Hay and Corn, a bounty of	5	5	0
To Wm. Higgins, for 36 years servitude in Husbandry, a premium of	3	3	0
To Thomas Eaton, for 32 ditto, a premium of	3	3	0
To John Wells, 1st premium for Shearing, with a coat and buttons	1	1	0
To James Tylee, second premium for ditto, a stout coat, and Society's buttons			
To George Ford, third premium for ditto, stout jacket, with the Society's buttons.			
	£144 18 0		

At the Annual Meeting in 1813.

To Rev. James Willis, of Sopley, Hants,
for the best Treatise on the Commuta-
tion of Tithes, the *Bedfordean Gold Medal*

To John Bennett, esq; of Pit House, for a
Crop of Turnips, and excellent Manage-
ment of his Farm, an Honorary Pre-
mium of a *Silver Bedfordean Medal*.

	£. s. d.		
To Mr. Rich. Reynolds, of Shobrooke, Devon, for exhibiting the best Bull, Cow, and Offspring, the President's premium*	-	-	21 0 0
To Mr. Thomas Dickson, for the 1st premium at the Ploughing Match 1813	5	5	0
To P. J. Miles, esq; 2d premium at ditto	3	3	0
To James Kemp, manager of 1st Plough, a Coat with the Society's buttons, and a premium of	-	-	1 1 0
To James Hensley, manager of second Plough, a Coat and buttons.	-	-	-
To John Bennett, esq; for ploughing a large quantity of Land with a pair of Oxen abreast, a premium of	-	5	5 0
To Sarah Coles, for reaping $3\frac{1}{2}$ acres of Wheat, a premium of	-	1	1 0
To James Tyley, for Shearing Sheep, a Coat with the Society's buttons, and a premium of	-	-	1 1 0
To George Ford, for ditto, a Coat and buttons, and a bounty of	-	1	1 0
To Gabriel Stone, esq; for exhibiting the best Fat Ox, a premium of	-	8	8 0
To Mr. Barr, 2d best ditto, ditto	-	4	4 0

* On its being announced that this Premium was awarded, by the Committee on Live Stock, to Mr. Reynolds; the President generously declared, that he should take upon himself the discharge of this Premium, it having always been his intention so to do, and added that he should continue the same practice as often as it might be successfully claimed, which he hoped would be annually.

	£.	s.	d.
To Mr. Wheller, for a good Fat Ox, a bounty of - - -	4	0	0
To Mr. Brooke, for the best Fat Cow, a premium of - - -	4	4	0
To Mr. Large, for the best Fat Wether, ditto - - -	6	6	0
To Mr. Hayward, for the second-best ditto, a premium of - - -	3	3	0
To ditto, for the best Fat Ewe, a bounty of - - -	2	2	0
To Mr. Garrett, for a Pen of breeding Ewes, ditto - - -	5	5	0
To G. W. Hall, jun. esq; for exhibiting a Pen of fine-woolled Shearling Rams, a premium of - - -	10	10	0
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